BULLETIN OF MISCELLANEOUS INFORMATION No. 8 1930
ROYAL BOTANIC GARDENS, KEW

XXXVII.—RUSHES IN NORFOLK.

From time to time people who interest themselves in the revival of ancient village industries ask questions as to the cultivation, collection and use of rushes, and in this connection the following letter written to Kew on October 10th, 1853, may be of interest. It has to do with the collection and sale of rushes for making rush-lights, and appears to be in response to a request made by Sir William Hooker for information upon the marketing of rushes in Norwich for that purpose.

Norwich, Oct. 10th, 1853.

" Dear Sir,

" The following are the results of enquiries made as you requested as to the statistics of Rush Fair.

" Rush Fair is held on the 2nd of August in the Yard and Barn of the Artickoke Inn, which stands on the site of the old ' Leper House without Magdalen Gates ' about 20 yards from the gates. The sale of Rushes is all that now remains of the once flourishing Magdalen Fair which, about 35 years since, was held at the same date on a piece of waste land just beyond the first milestone on the Sprowston Road, about 74 miles beyond Magdalen Chapel, in favour of which I suppose the original fair was granted. After this piece was inclosed, the tenant had to find a suitable field to hold the fair on and Mr. Beckwith tells us that he once officiated as steward to the Pie Powder court which was held during the fair. I remember about 25 years since seeing the Bailiffs with their halberds endeavouring to pacify a party of quarrelsome rustics, for the fair was too well-known by the quantity of fighting and wrestling customarily practised there. At this time there were Booths, Shows and a good horse and cattle fair.

" The rushes at the present time are gathered and prepared by women and children from a small tract of marsh on the North of the River Bure, containing the parishes of Horning, Hickling, Catfield and the neighbouring villages, all within a short distance of the Abbey of St. Bennet of Hulme. The species employed are the *Juncus effusus* and *J. glomeratus*, and the women aver that they have to wade up to their waists in water to obtain the longest and best samples. When cut they are divested with a penknife of the bark on two opposite sides leaving the other two to support the pith, they

are then soaked in a running stream until they are cleansed of all the green sap and then dried and packed for the Fair.

" The Rushes are made up into whips containing 12 rushes each, the whips into dozens and the dozens into grosses, neatly tied together at the top end and when set up for sale in the fair they have a very clean and attractive appearance.

" The number of gross sold in 1853 at the Fair was 504 at prices varying from 2/6d. to 8/- at an average of 4/6d. per gross.

" Each gross is reckoned sufficient for 12 dozen lbs. of candles; at this rate the quantity sold would make 870,912 candles.

" I believe that there are some sold at Yarmouth and elsewhere but whether they are the residue of the Fair I cannot ascertain. Like other markets there is a deal of manoeuvring with the dealers. The country people usually agree not to take less than a certain price, but if this does not suit the buyers and they ' hold off ' it is sometimes noon before any bargains are made. The average of the two or three years would be desirable as I hear that last year the supply was less than this.

" I trust the above information is correct, but I cannot entirely reconcile some varying statements; should I find any important errors I will write and correct them.

I remain, etc.,

F. G. BAYFIELD."

In a supplementary letter the following particulars are said " to have been procured from young Mr. Kitton who lives with Mr. Wigham."

" The Rush Fair, formerly called Maudlin Fair, was formerly held on a portion of Mousehold Heath called the ' Fairstead ' ; it is now held at the ' Artichoke ' Public House, Magdalen Street, and commences at 4 o'clock in the morning.

" The rushes are the produce of Hickling, Winterton, Sea Palling, all villages in Norfolk, and are gathered at the latter end of June, it being considered a Harvest by the inhabitants of the above villages. A woman with 4 children would earn on the average from £3 to £4. The rushes made into a ' bundle ' containing 36 rushes, 12 small bundles make 1 large bundle, 12 large bundles 1 gross. The quantity brought last fair was 1,500 gross and the amount realized was £375, being 5/- per gross. Norfolk rushes are considered the best. A large-sized brown paper is made here called rush paper for packing the rushes. A trade is also done at Somersham, Hunts., in rushes.

" The reeds besides being used for thatching are used here instead of laths for plastering upon.

" I have made enquiry if they are used in weaving and I am told they are not. The Slaies were formerly made of *split cane* and were called by the weavers ' reeds.'

XXXVIII.—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA*: II. Chondodendron candicans, a Menispermaceous Bush-rope of Guiana.

N. Y. Sandwith.

The floor of the Guiana forest is more or less copiously sprinkled with seedlings of trees and bush-ropes which deserve more careful attention from collectors than they usually receive. A prolonged stay in a single locality is bound to provoke an interest in such vegetation in any intelligent observer, and provides the only satisfactory means for collecting and studying it. These seedlings frequently present constant characters in the shape, texture, venation and indumentum of their leaves which differ to a very remarkable degree from those of the mature tree or rope which towers, it may be, 150 feet above them. The botanists of the Oxford University Expedition to British Guiana, 1929, while encamped on the Moraballi Creek, Essequibo River, found particularly good instances of this phenomenon in such genera of tall trees as *Mora* and *Catostemma*. In the latter instance the seedlings provided excellent distinguishing characters between two species, the mature foliage of which was extremely similar.

The seedling leaves of the great bush-ropes, especially those of *Bauhinia* species, are very striking both in shape and indumentum, and they are sometimes found in herbaria in the covers of indeterminatae or queried as new species. The bush-rope which is the subject of the present paper was actually described on three, perhaps on four, occasions from seedling material alone, simply because the beautiful leaves had attracted the notice of collectors, who omitted to take the whole plant with its roots; and the absence until recently of flowering material of the mature plant collected at the same time as that of the seedling has caused it to be placed in the wrong genus by botanists in herbaria.

The identification of seedlings of bush-ropes is obviously a more difficult matter than that of seedling trees, because they are found in abundance over a wide area and often at some distance from the base of the rope which is sprawling over the forest canopy; and any collector in the tropical forest will testify to the difficulty and uncertainty of procuring good material of such ropes, even when the flowers have been found on the forest floor, or detected through field glasses in the canopy. Moreover, the drupaceous fruits of a Menispermaceous climber are no doubt attractive to birds, and account for the presence of quantities of seedlings within a wide radius in the neighbourhood of a mature rope. The dioecism of the Menispermaceae further complicates the question, and adds greatly to the difficulty of their identification both in the field and the herbarium. Thus the mature rope when brought to the ground may prove to be either a male or a female parent, or it may be only another plant of the same generation which has succeeded in finding the support necessary for its development, and has reached the canopy.

*Continued from *K.B.* 1930, p. 215.

Presumably only those seedlings which rise in a favourable position at the base of a trunk can ever hope to climb to maturity ; and it may be assumed that the vast majority come to nothing more than the small erect plants with curious and beautiful leaves which puzzle the collector as he walks through the forest. No plants were observed in an intermediate stage in the process of climbing up a trunk. Probably this process is a very quick one, and the successful seedling puts out no leaves until it has reached the canopy ; the behaviour, however, of such young ropes and of their unsuccessful contemporaries requires a special study, which would be of the greatest interest and value.

Seedlings of such a climber were found by the botanists of the Oxford Expedition in an area of morabukea forest by the Moraballi Creek which had been chosen as a sample plot for ecological work. They occurred in large numbers in this type of forest, which is darker than most, and has a scantier vegetation on its floor. They reached a height of from one to four feet, and were remarkable for the smooth snow-white lower surface of the ovate or elliptic, cuspidate, strongly 3–5-nerved leaves, which contrasted sharply with the green and glabrous upper surface. This colour is due to an indumentum that is so finely adpressed that it cannot be distinguished satisfactorily through an ordinary lens, and the surface appears to be glabrous. A rope which was evidently related to these seedlings was found in the same plot, its flowers being discovered through field-glasses ; and excellent flowering and leaf material was secured by felling one of the supporting trees. The inflorescence showed the plant to be a male, and the rope was well known to the two native Arawaks who brought it down under the name of Teteabo which, translated into Creole, means " Granny's Backbone." The same Indians were, of course, familiar with the seedlings which, they agreed, were those of Teteabo, and there can be little doubt as to the correctness of the identification.

On returning to Kew, a single sheet was discovered in the Kew Herbarium which agreed with this flowering material. It was collected by Jenman in 1888 on the Issororo River, British Guiana, and had been labelled " Sciadotenia ? " by Diels. The specimen bears good leaves, but only two small axillary paniculate inflorescences, from which all the flowers have fallen, and it is hardly surprising that it was not placed with certainty in any particular genus. Fortunately, the material collected by the Oxford Expedition places the identification of this plant beyond all doubt. The large, conspicuous panicles with very numerous flowers on long pedicels immediately prove it to belong to the genus *Chondodendron*, and the specimens bear a very close superficial resemblance to the type material of *C. polyanthum* Diels. Dissection of the flower shows, in fact, that this species falls into the section of the genus comprising species with six sepals, and hitherto represented by *C. polyanthum* Diels and *C. iquitanum* Diels of the Amazons forests. From these

two it is easily distinguished by the much smaller dimensions of all the floral parts ; if, therefore, these specimens had not been correlated with the seedling material, they would certainly have been described as a new species of *Chondodendron*.

No difficulty, however, was experienced in finding a name for the seedling specimens. They agree exactly with the type of *Sciadotenia leucophylla* Miers, collected in " Guiana belgica " by Alexander Anderson, and deposited in the herbarium of the British Museum. Anderson collected in Demerara in 1791, before the colony was formally ceded to Britain in 1814-15. *S. leucophylla* appears in Diels' Monograph of the family in the Pflanzenreich as a synonym of *S. candicans* (Rich.) Diels, which is based upon *Abuta candicans* Rich. ex DC., and it is clear that Diels saw the type specimens of both *leucophylla* and *candicans*, so that the identification may be accepted as correct. *A. candicans* was evidently described by De Candolle from exactly similar seedling material from French Guiana ; and the same is true of still another plant, *Cocculus dichroa* Mart. from Pará, which is treated as a synonym of *S. candicans* by Diels. One cannot help wondering if Diels himself has not followed his predecessors when, in Rec. Trav. Bot. Néerl. xxii. 348 (1925), he describes an *Abuta ? Pullei* Diels sp. nov., from material which is obviously that of a seedling, with leaves that are very similar in colour and indumentum, but apparently not cuspidate.

It will be noticed that Diels has assigned fruiting material collected by Huber on the Rio Acre to *Sciadotenia candicans*. This is not represented at Kew, but from Diels' description it does not appear to be at all typical of the fruiting inflorescence of *Sciadotenia* as figured by him in fig. 28 ; in fact, the racemose inflorescence with pedicels 8-12 mm. long is far more likely to belong to *Chondodendron*.

The leaves of these seedlings resemble those of the mature plant in shape, but differ from them in the following respects. The petioles are glabrous not tomentellous, and the thickened portion below the lamina is shorter ; they are, moreover, more conspicuously striate, a character shared by the stem and branches. The lamina is thinner in texture, and often three-nerved, being five-nerved only in the broader examples. The upper surface tends to keep a bright green colour in the herbarium, whereas that of the leaves of the mature plant dry a dark olive or even a brownish-olive. The lower surface has the conspicuous snow-white and remarkably fine indumentum which has already been mentioned ; that of the leaves of the mature plant is a less conspicuous, greyish-white colour, and the tomentum is not quite so fine or dense, so that the reticulation is far more apparent. The venation of both surfaces of the mature leaf is stronger and more complex. Most, if not all, of these distinctions appear perfectly natural and would be expected to occur in such a case.

As the result of this evidence collected from the field and the herbarium, Teteabo must bear the name *Chondodendron candicans*,

and the new combination is accordingly made here, and is followed by a description of the branchlets, leaves and male inflorescence of the mature plant.

Chondodendron candicans (*Rich. ex DC.*) *Sandwith*, comb. nov. atque descr. ampliata; *C. polyantho* Diels atque *C. iquitano* Diels affinis, partibus floris masculi multo minoribus differt.—*Abuta candicans* Rich. ined. in Herb. Juss. ex DC. Syst. i. 543 (1818). *Sciadotenia leucophylla* Miers, Contrib. Bot. iii. 344 (1871). *S. candicans* Diels in Engl. Pflanzenreich, iv. 94, p. 87 (1910). *Cocculus dichroa* Mart. in Flora xxiv. Beibl. ii. 46 (1841).

Frutex silvester, ingens, scandens, hactenus quoad folia plantarum incipientium humilium terra sparsarum tantum etsi optime descriptus. *Caulis* volubilis, crassus, apice ramis per summas arbores pervagantibus terminatus. *Ramuli* annotini nigrescentes, pubescentes vel glabrati, teretes, leviter striati, 4 mm. diametro; hornotini novelli cinereo-purpurascentes, dense tomentelli, teretes, obscure striati vel sulcati, 2–3 mm. diametro; internodia 1–6 cm. longa. *Folia* ovato-elliptica, apice 1–1·5 cm. plus minusve abrupte cuspidata, basi obtuse cuneata vel fere rotundata, 6–17 cm. longa, 3–10 cm. lata, versus ramuli apicem sensim decrescentia, satis rigide chartacea, integerrima, supra glabra subnitida siccitate obscure olivacea, subtus cinereo-alba passim tomento denso minutissimo obtecta, fortiter quinquenervia vel saepe subquintuplinervia, nervis primariis lateralibus arcuatis, secundariis angulo saepius fere recto exorientibus subrectis parallelisque, rete venularum supra prominente subtus intricatissimo; petiolus tomentellus, leviter obscure striatus, 2–8 cm. longus, circiter 1 mm. diametro, superne sub lamina usque ad 1 cm. longitudinem distincte incrassatus. *Inflorescentiae masculae* in quoque ramulo novello crebrae conspicuae, supra- ac infra-axillares, paniculatae, passim densissime cinereo-tomentellae, triangulari-lanceolatae vel subpyramidales, ad 15 cm. longae, basi vulgo 4–10 cm. latae; rami primarii utrinque vulgo 7–10, saepius angulo fere recto patentes paralleli scalariformes, alterni, imi parte nuda ad 3 cm. longa, sursum decrescentes; pedicelli satis conferti, vulgo 6–10, speciose arcuati, 2–10 mm. longi; bracteolae flores amplectentes, minutae, ovatae, 0·5 mm. longae, circiter 0·3 mm. latae. *Flores* facile caduci, alabastro globosi circiter 1 mm. diametro. *Sepala* sex; exteriora ovata, concavo-cymbiformia, 0·8 mm. longa, 0·6 mm. lata, extra tomentella, intus nisi prope margines glabra; interiora majora, rhomboideo-ovata, obtusa, ad 1·5 mm. longa, 1·2 mm. lata, extra dense tomentella, intus glabra. *Petala* sex, obovata vel rhomboidea, fere unguiculata, ad 0·6 mm. longa atque lata, utrinque glabra. *Stamina* ad 0·75 mm. longa, sursum incrassata, glabra. *Inflorescentia feminea* non visa.

British Guiana. "Guiana belgica," *Alex. Anderson* (Herb. Mus. Brit.—type of *Sciadotenia leucophylla* Miers). In morabukea forest, Moraballi Creek, Essequibo River, Nov. 6th, 1929, *Sandwith*

561. Issororo River, 1888, *Jenman* 5199.—Vernacular Names: "Teteabo" (Arawak); "Granny's Backbone" (Creole). Jenman notes it as the Warrau Indians' "other kind of poison."

XXXIX.—FERNS COLLECTED IN FIJI BY SIR EVERARD IM THURN, K.C.M.G.

C. H. Wright.

An enumeration, by Dr. W. B. Turrill, of the flowering plants (excluding orchids) collected in Fiji by Sir Everard im Thurn during 1905-1907 was published in the Journal of the Linnean Society, Botany, vol. xliii. pp. 15-39 (1915). Various circumstances prevented the ferns being fully dealt with at that time, but a preliminary list, which was then drawn up, has now been revised. The localities mentioned in it will supplement those quoted by Dr. E. B. Copeland in his "Ferns of Fiji," published in 1929 in Bulletin no. 59 of the Bernice P. Bishop Museum, Honolulu, and founded chiefly on the collections of Messrs. Gillespie and Parks. The dates of collection indicate the time when each species produces fruit.

It has not been considered necessary to add the distribution of each species outside Fiji, as this can readily be obtained from Dr. C. Christensen's Index Filicum, the classification and nomenclature of which are followed in this list.

List of abbreviations :—

C. Chr.=C. Christensen. Index Filicum and supplements. 1905-1917.

Gibbs=L. S. Gibbs. A Contribution to the Montane Flora of Fiji (Journ. Linn. Soc., Bot., xxxix. 137-212, 1909).

H. B.=W. J. Hooker and J. G. Baker. Synopsis Filicum, ed. ii. 1874.

Horne=J. Horne. A Year in Fiji, 1881 (Ferns by J. G. Baker).

Seem.=B. Seemann. Flora Vitiensis, 1873 (Ferns by W. Carruthers).

Trichomanes caudatum *Brack.*; H.B. 85; Seem. 344; Horne 279; C. Chr. 637.

Mount Victoria, 5000 ft., 1 May, 1905, *im Thurn* F. 25.

T. rigidum *Sw.*; H.B. 86 partim; Horne 279; C. Chr. 649; Gibbs 184.

Mount Victoria, 5000 ft., 1 June, 1905, *im Thurn* 28.

T. Bauerianum *Endl.*; C. Chr. 636. *T. apiifolium* Presl; H.B. 86; Horne 279.

Nandarivatu, Matakula warpath, 24 Nov., 1906, *im Thurn* 278.

T. maximum *Bl.*; H.B. 86; Horne 279; C. Chr. 644; Gibbs 184, *T. millefolium* Presl; Seem. 345.

Hill above Nandarivatu, 30 Jan., 1906, *im Thurn* 53.

Lace fern, viviparous.

T. gemmatum *J. Sm.*; H.B. ed. i. 87 partim; C. Chr. 640.

Mount Victoria, 5000 ft., 1 May, 1905, *im Thurn* F. 23.

Hymenophyllum multifidum *Sw.* ; H.B. 69 ; Seem. 342 ; Horne 279 ; C. Chr. 364 ; Gibbs 185.
Mount Victoria, 5000 ft., 1 May, 1905, *im Thurn* 24.

Dryopteris patens *O. Kuntze* ; C. Chr. 283. *Nephrodium patens* Desv. ; H.B. 262.
Nandarivatu, 31 March, 1906, *im Thurn* 231.

D. orientalis *C. Chr.* 281. *Nephrodium albopunctatum* Desv. ; H.B. 264 ; Horne 282.
Nandarivatu, 13 March, 1906, *im Thurn* 148.

D. unita *O. Kuntze* ; C. Chr. 299. *Nephrodium cucullatum* Baker ; H.B. 290.
Nandarivatu, 1 March, 1906, *im Thurn* 124.

Didymochlaena truncatula *J. Sm.* ; C. Chr. 225. *D. lunulata* Desv. ; H.B. 358 ; Horne 281. *D. sinuosa* Desv.
Nandarivatu, 13 Feb., 1906, *im Thurn* 104.

Polystichum aristatum *Presl* ; Seem. 358. *Aspidium aristatum* Sw. ; H.B. 255 ; Horne 281.
Nandarivatu, 13 Feb., 1906, *im Thurn* 99 and 105.

Leptochilus cuspidatus *C. Chr.* 384. *Acrostichum repandum* Bl. ; H.B. 419 ; Horne 283.
Nandarivatu, 13 Feb., 1906, *im Thurn* 103.

Oleandra neriiformis *Cav.* ; H.B. 302 ; C. Chr. 466. *O. mollis* Presl ; Seem. 360 ; Horne 282.
Nandarivatu, 15 Feb., 1906, *im Thurn* 113.

Nephrolepis cordifolia *Presl* ; H.B. 300 ; Horne 282 ; C. Chr. 453. *N. tuberosa* Presl ; Seem. 361.
Nandarivatu, 11 March, 1906, *im Thurn* 143.

N. biserrata *Schott* ; C. Chr. 453. *N. acuta* Presl ; H.B. 301 ; Seem. 361 ; Horne 282.
Nandarivatu, 11 March, 1906, *im Thurn* 144.

Humata botrychioides *Brack.* ; C. Chr. 353. *Davallia botrychioides* Baker ; H.B. 90, 467 ; Horne 279.
Nandarivatu, among small bushes in open rocky ground, 1 March, 1906, *im Thurn* 123.

H. sessilifolia *Mett.* ; C. Chr. 354 ; Gibbs 186. *Davallia sessilifolia* Bl. ; H.B. 89.
Nandarivatu, 6 March, 1906, *im Thurn* 131.

Odontosoria chinensis *J. Sm.* ; C. Chr. 464. *Davallia tenuifolia* Sw. ; H.B. 102 ; Horne 280. *D. chinensis* J. E. Sm. ; Seem. 339.
Nandarivatu, Mba road, 11 March, 1906, *im Thurn* 98.

Lindsaya decomposita *Willd.* ; C. Chr. 392. *L. lobata* Poir. ; H.B. 111 and 471 ; Horne 280. *L. Seemanni* Carruth. ; Seem. 338.
Mount Victoria, April, 1905, *im Thurn* 32.

Diplazium melanocaulon *Brack.* ; C. Chr. 235. *D. coriaceum* Carruth. ; Seem. 356. *Asplenium melanocaulon* Baker ; H.B. 240 ; Horne 281.
Nandarivatu, 13 Feb. 1906, *im Thurn* 101.

Asplenium gibberosum *Mett.* ; C. Chr. 113. *Davallia gibberosa* Sw. ; H.B. 100 and 470 ; Seem. 339 ; Horne 280.
Nandarivatu, 15 Feb., 1906, *im Thurn* 108.

A. lucidum *Forst.* ; C. Chr. 119. *A. obtusatum* var. *lucidum* Baker in H. B. 207.
Nandarivatu, 22 Nov., 1906, *im Thurn* 272.

A. praemorsum *Sw.* ; C. Chr. 127. *A. furcatum* Thunb. ; H.B. 214 and 457.
Na Vai, 28 March, 1906, *im Thurn* 214.

A. bipinnatifidum *Baker* in H.B. ed. i. 221 ; C. Chr. 102. *A. bipinnatum* Brack. ; H.B. 221 ; Seem. 355 ; Horne 281.
Hill above Nandarivatu, on tree branches, *im Thurn* 52.

Blechnum cf. **vulcanicum** *Kuhn* ; C. Chr. 161. *Lomaria vulcanica* Bl. ; H.B. 176 ; Horne 281.
Nandarivatu, Sindetree Hill, 21 Nov., 1906, *im Thurn* 261.
Fertile frond only.

B. lanceolatum *Sturm* ; C. Chr. 155. *Lomaria lanceolata* Spreng. ; H.B. 177 ; Horne 281.
Na Vai, 8 March, 1906, *im Thurn* 111.

Syngramma Hookeri *C. Chr.* 346 and 629. *Hemionitis lanceolata* Hook ; H.B. 398 ; Seem. 372 ; Horne 283.
Na Vai, 8 March, 1906, *im Thurn* 138.

Cheilanthes tenuifolia, *Sw.* ; H.B. 138 ; Seem. 347 ; Horne 280 ; C. Chr. 180.
Nandarivatu, growing among short scanty grass in open sunny places, 2 March, 1906, *im Thurn* 127.
Common, at least on north slope of island.

Adiantum hispidulum *Sw.* ; H.B. 126 ; Seem. 346 ; Horne 280 ; C. Chr. 28 ; Gibbs 186.
Lower Fall, Nvalia, 3 Feb., 1906, *im Thurn* 70. Nandarivatu, 13 Feb., 1906, *im Thurn* 97.

Monogramma paradoxa *Bedd.* ; C. Chr. 430. *M. Junghuhnii* Hook. ; H.B. 375 ; Horne 283 ; Gibbs 186.
Nandarivatu, 6 March, 1906, *im Thurn* 136.

Vittaria elongata *Sw.* ; H.B. 395 partim ; Horne 283 ; C. Chr. 653.

Nandarivatu, Nadrau Road, 26 March, 1906, *im Thurn* 197.

V. scolopendrina *Thw.* ; H.B. 396 ; Horne 283 ; C. Chr. 655.

Nandarivatu, 25 Feb., 1906, *im Thurn* 117.

Antrophyum plantagineum *Kaulf.* ; H.B. 393 ; Seem. 371 ; Horne 283. C. Chr. 61.

Na Vai, 28 March, 1906, *im Thurn* 212. Nandarivatu, 12 Feb., 1906, *im Thurn* 96.

A. reticulatum *Kaulf.* ; H.B. 393 ; Horne 283 ; C. Chr. 61.

Na Vai, 23 March, 1906, *im Thurn* 213.

Hymenolepis spicata var. **mucronata** *C. Chr.* 355. *H. mucronata* Fée. *H. spicata* Gibbs 186. *Acrostichum spicatum* L.f. ; H.B. 424 partim ; Horne 283.

Nandarivatu, 10 Feb., 1906, *im Thurn* 94, and 26 Nov., 1906, *im Thurn* 289.

Calymmodon latealatus *Copel. Polypodium cucullatum* Bl. partim ; H.B. 324 ; C. Chr. 520.

Among moss on rocks and tree trunks on wet part of Mount Victoria, 5000 ft., 1 May, 1905, *im Thurn* 29.

Polypodium contiguum *J. Sm.* ; C. Chr. Suppl. ii. 57. *Davallia contigua* Spreng. ; H.B. 94 ; Seem. 338 ; Horne 279 ; C. Chr. 208. *Prosaptia contigua* Presl.

Hill above N'valu, 30 Jan., 1906, *im Thurn* 54.

P. loxogramma *Mett.* ; C. Chr. 541 ; Gibbs 187. *Gymnogramme lanceolata* Hook. ; H.B. 387 ; Horne 283.

Nandarivatu, by water supply, 26 Nov., 1906, *im Thurn* 290.

P. crassifrons *Baker* in H.B. ed. i. 325 ; C. Chr. 519.

Mount Victoria, 5000 ft., 1 May, 1905, *im Thurn* 26.

P. Brownii *Wickstr.* ; H.B. 355 ; Horne 282 ; C. Chr. 514. *Dictyopteris attenuata* Presl ; Seem. 366.

Nandarivatu, 4 Feb., 1906, *im Thurn* 73.

P. linguaeforme *Mett.* ; H.B. 358 ; Horne 282 ; C. Chr. 540 ; Gibbs 187.

Nandarivatu, 20 Nov., 1906, sheathing on to tree trunks, *im Thurn* 258.

P. triquetrum *Bl.* ; H.B. 359 ; Horne 282 ; C. Chr. 571.

Nandarivatu, Suva Road, near second milestone, *im Thurn* 265.

P. Phymatodes *L.* ; H.B. 364 ; Horne 283 ; C. Chr. 553. *Pleopeltis Phymatodes* T. Moore ; Seem. 368.

Hill above Nandarivatu, 30 Jan., 1906, *im Thurn* 51.

P. nigrescens *Bl.* ; H.B. 364 ; Horne 283 ; C. Chr. 547. *Pleopeltis nigrescens* Carruth. ; Seem. 368.
Na Vai, 22 March, 1906, *im Thurn* 220.

P. Powellii *Baker* in H.B. ed. i. 364 ; C. Chr. 556.
Nandarivatu, 18 Feb., 1906, *im Thurn* 109, and 1 March, 1906, *im Thurn* 125.

Drynaria rigidula *Bedd.* ; C. Chr. 249. *Polypodium rigidulum* Sw. ; H.B. 368 ; Horne 283.
Nandarivatu, 1 March, 1906, *im Thurn* 126.

Elaphoglossum feejeense *Brack.* ; C. Chr. 306. *Acrostichum feejeense* Hook. ; H.B. 401 and 519 ; Seem. 372 ; Horne 283.
Nandrau, 5 Dec., 1906, *im Thurn* 315. Vesari Swamp, on tree trunks, 23 Aug., 1907, *im Thurn* 368.

Gleichenia glauca *Hook.* ; C. Chr. 321. *G. longissima* Bl. ; H.B. 12.
Nandarivatu, Suva Road, near second milestone, 22 Nov., 1906, *im Thurn* 264.

Schizaea dichotoma *J. E. Sm.* ; H.B. 430 partim ; Seem. 375 ; Horne 284 ; C. Chr. 616 ;/Gibbs. 187.
Nandarivatu, 2500 ft., 30 April, 1905, *im Thurn* 15. Nandarivatu, open ground along Suva Road, 22 Nov., 1906, *im Thurn* 270.

Lygodium reticulatum *Schkuhr* ; H.B. 439 ; Horne 284 ; C. Chr. 413 ; Gibbs 188. *Hydroglossum scandens* Presl non Willd. ; Seem. 376.
Hill above Nandarivatu, 30 Jan., 1906, *im Thurn* 55. Nandarivatu, 3 Dec., 1906, *im Thurn* 301.

Leptopteris Wilkesiana *H. Chr.* Farnk. 335 ; C. Chr. 390. *Todea Wilkesiana* Brack. ; Seem. 375 ; Horne 284. *T. Fraseri* var. *Wilkesiana* H.B. 427.
Nandarivatu, along Mba Road, 11 Feb., 1906, *im Thurn* 141.

Marattia Cooperi *T. Moore* ; C. Chr. 414.
Nandarivatu, old Malakula warpath, 24 Nov., 1906, *im Thurn* 277.

Ophioglossum pedunculosum *Desv.* ; C. Chr. 471. *O. vulgatum* H.B. ed. i. 445 partim.
Nandarivatu, 3 Dec., 1906, *im Thurn* 307.

O. reticulatum *L.* ; H.B. 446 partim ; C. Chr. 472.
Nandarivatu, 26 Feb. 1906, *im Thurn* 119.

Botrychium daucifolium *Wall.* ; H.B. 162 ; C. Chr. 162 ; Gibbs 188.
Nandarivatu, old Nadrau Road, 24 Nov., 1906, *im Thurn* 276.

Lycopodium phyllanthum *Hook. et Arn.* ; Baker, Handb. Fern Allies, 22.

Mount Victoria, April, 1905, *im Thurn* 33. Nandarivatu, 13 Feb., 1906, *im Thurn* 95.

Psilotum triquetrum *Sw.* ; Horne 279 ; Baker, l.c. 30 ; Gibbs 189.

N'valu, lower fall, 3 Feb., 1906, *im Thurn* 71. Nandarivatu, by water supply, 26 Nov., 1906, *im Thurn* 291.

Selaginella flabellata *Spring* ; Horne 279 ; Baker, l.c. 98.

Nandarivahi, 13 Feb., 1906, *im Thurn* 102.

" Common. Tall growing, say 4–5 ft."

S. firmula *A. Br.* ; Baker, l.c.

Nandarivatu, 13 March, 1906, *im Thurn* 107.

XL.—THE GENUS BRACHYSTEGIA IN NYASALAND.

P. Topham.*

The trees of the genus *Brachystegia* form a most important constituent of the vegetation of Nyasaland. The vegetational type in which this genus is predominant occupies roughly one-third of the total area of the country.

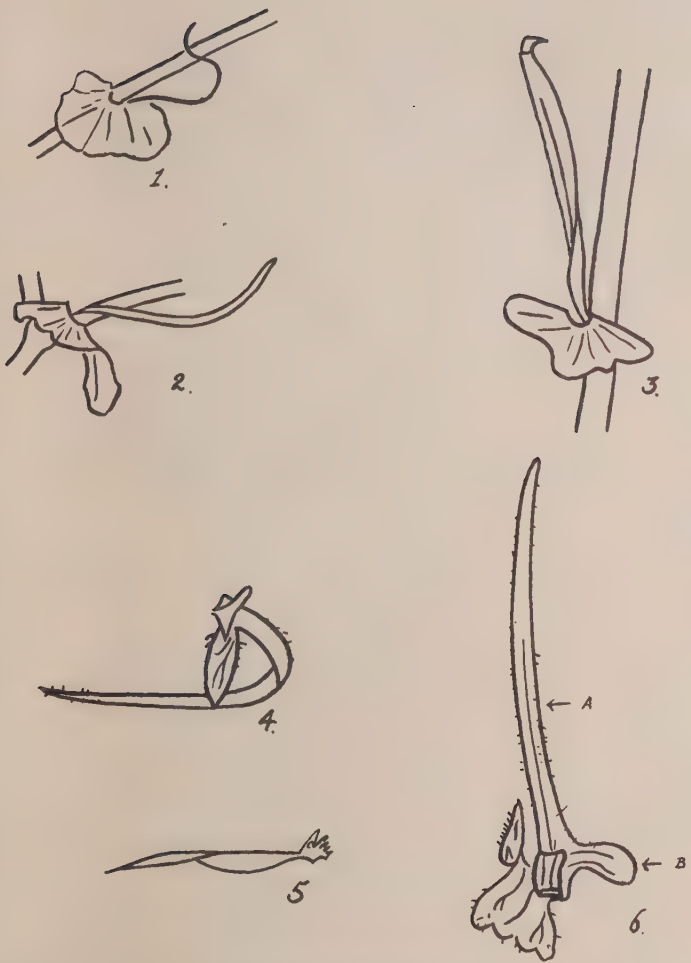
The local uses for the trees are numerous, firstly as firewood and as poles for the construction of huts ; secondly many species are of value for the bark which is put to diverse uses by the natives in all parts of the country. It is commonly beaten out into bark-cloth which still is sometimes worn as clothing and commonly is made into small sacks ; another use for a round of bark is to make of it a beehive. There is no evidence to show that any of the products of these trees are used medicinally ; some species contain a good deal of tannin.

A certain amount of herbarium material has been collected in Nyasaland during the last four years, especially by Dr. J. Burtt Davy during a visit in 1929. The following key is based on all specimens taken up till the end of 1929. No new species is described, since the few specimens that did not fit into the key are insufficiently complete to form the basis of a description.

In the revision of this genus in the *Kew Bulletin*, 1923, by J. Burtt Davy and J. Hutchinson, only nine species were shown as occurring in Nyasaland, and in "The Leguminosae of Tropical Africa" by Edmund G. Baker, 1930, only ten. It is quite probable that some half-dozen more species may yet be found, but it is unlikely that, of these, many will be new. The following key includes twenty-four species and one variety.

Variation is extremely wide in many species ; in particular, the coppice shoots are often very variable, while exposure and aspect produce curiosities.

*Research conducted at the Imperial Forestry Institute, Oxford, in collaboration with Dr. Burtt Davy ; the identifications verified with the types at Kew, by the courteous permission of the Director.



Stipules of *Brachystegia*, shewing variation within a species.
1, 2, 3. *B. filiformis* (nat. size).
4, 5, 6. *B. Hockii* (x 3).
6. A. appendage; B. broad foliaceous base.

Vernacular names supplied by the most reliable of natives are apt to cover two or more species, or sometimes several names are given to one species by mistake.

In revising the key made by Burtt Davy and Hutchinson, it was found simplest to distinguish three main groups according to the number of pairs of pinnae to the leaf. It is evident that the presence or absence of stipules has significance as a character, but in identifying new material it is not always satisfactory, as the stipules are variable (see fig. p. 349) and remain on the tree a varying length of time. In the first group all specimens, except one coppice shoot, have stipules either persistent or early deciduous, all have hirsute leaves and all have at least twelve juga. In the second group (6–11-jugate), the hairy specimens have stipules, which are deciduous late or early. In the third group (2–5-jugate), the glabrous species are all entirely exstipulate, while the others have stipules when young but these are deciduous.

Accordingly, it would appear that the "Stipulatae" of Burtt Davy and Hutchinson should include every species which in its youngest stages has stipules, and we should not attempt to discriminate between those in which the stipules are persistent and those in which they are deciduous, since it has been observed in the field that the time of falling is so variable a character.

The following key has been drawn up for use in the field. The flowering season is so short that as a rule only leaves are available.

Key to the species of the genus *Brachystegia* known to occur in Nyasaland.

Leaflets 12 or more (up to 30) pairs (rarely 10 as in *B. Woodiana* and *B. Wildemaniana*); leaf-rhachis or lamina, or both, pubescent (except in a coppice shoot of *B. Wildemaniana* De Wild.); stipulate in all species, but the stipules early deciduous in *B. flagristipulata*.....Section 1. PLURIJUGATAE.

Leaflets 6–11 pairs; the species with indumentum have stipules, but the glabrous species are exstipulate or their stipules are early deciduous.....Section II. INTERMEDIAE.

Leaflets fewer than 6 pairs; petiolules very short; uppermost pair of leaflets generally the largest; in glabrous species stipules are absent, but in species with indumentum the stipules are early deciduous (not seen in *B. mpalensis*)...Section III. PAUCIJUGATAE.

Section I. PLURIJUGATAE.

Leaflets 24–25 pairs or more; both rhachis and lamina more or less hairy above and beneath:

Leaflets about 2 mm. broad, up to 30 pairs; midrib very excentric; stipules often early deciduous (but not so in Nyasaland material).....1. *B. mimosaefolia.*

Leaflets about 1 cm. broad, about 25 pairs; midrib more or less central; stipules persistent.....2. *B. Boehmii.*

Leaflets 21-23 pairs ; leaf rhachis more or less hirsute but leaflets more or less glabrous or with faint white pubescence on lamina ; leaflets approximate, midrib rusty below, apices slightly emarginate, bases unequal subcordate ; leaf-rhachis enlarged, more or less winged a little below the juga. The leaf as a whole is elliptic in form ; stipules persistent.....3. *B. Goetzei.*

Leaflets 14–20 pairs, rarely fewer (*B. Woodiana* and *B. Wildemaniana*) :

Stipules deciduous at an early stage :

Midrib more or less central ; leaflets in normal leaves mostly 1·0–1·2 cm. broad. Inflorescence with spreading lateral branches. Normally fewer than 20 pairs of leaflets but a specimen from Tanganyika at present included has 20–25 pairs.....4. *B. flagristipulata.*

Midrib markedly excentric ; leaflets normally 4–6 mm. broad, about 16-jugate. Inflorescence dense with few branches.....5. *B. tamarindoides* (from Rhodesia).

Stipules persistent :

Midrib markedly excentric ; leaflets 4–6 mm. broad, about 16-jugate.....5. *B. tamarindoides* (from Nyasaland).

Midrib more or less central :

Hairs on the leaf-rhachis brown :

Indumentum on midrib fairly dense both above and beneath, rusty on midrib, white on lamina, rather variable in texture and length. Leaflets lanceolate, 14–19-jugate (rarely, from Tanganyika, 20–22-jugate) ; reticulation close or coarse ; bases of leaflets either truncate or slightly cordate, apices slightly or rarely conspicuously emarginate. Stipules very variable particularly in coppice, from 4 cm. long and spatulate to 1 cm. long and linear.....6. *B. filiformis.*

Indumentum on midrib above and beneath more or less sparse ; leaflets 10–17 pairs.....7. *B. Woodiana.*

Hairs on leaf-rhachis white or with a few brown hairs actually at the juga ; stipules much more persistent on coppice than on old wood. (One coppice specimen, considered to belong here, is glabrous and with spatulate stipules 6–8 cm. long) ..... 8. *B. Wildemaniana.*

Section II. Intermediae.

*Stipules wanting or early deciduous :

Leaves wholly glabrous :

Rhachis of inflorescence glabrous ; racemose branches of the panicle few (5 or 6) ; bracts glabrous except for the midrib and the ciliate margins, pronouncedly ribbed ; bracteoles quite glabrous except for the ciliate margins. Leaflets 2–4 cm. × 0·6–1·1 cm., in 6–7–8 pairs, standing away from the rhachis by a minute but definite petiolule.....9. *B. Bournei.*

Rhachis of inflorescence tomentellose ; branches of the panicle more numerous (7–9) ; bracts and bracteoles puberulous and distinctly ribbed :

Leaflets 9–12 pairs, 3·5–5·5 × 1·0–1·7 cm.; base of leaflet approximate to rhachis without petiolule...10. *B. longifolia.*

Leaflets 8 pairs, smaller than in the species.....
11. *B. longifolia* var. *parvifolia.*

Leaflets 6 pairs, see exceptional specimens of *B. edulis* and *B. Oliveri* in Sect. III.

Leaves (either rhachis or leaflets or both) hirsute :

Indumentum of rhachis composed exclusively of white hairs ; leaflets 7–10 pairs, oblong-lanceolate :

Branchlets with short spreading white hairs ; leaflets 2·2–4·5 cm. long, 8–9-jugate (indumentum sometimes sparse, causing confusion with *B. longifolia*).....
12. *B. apertifolia.*

Branchlets minutely rusty pubescent ; leaflets about 7–8 cm. long, 7–10-jugate .....13. *B.* (*leonensis* ?).

Indumentum not exclusively of white hairs ; leaflets 7–11 pairs, generally about 3 cm. × 1 cm., the bases narrowed on one side ; usually the leaf-rhachis thickened below the juga. Very variable, especially the coppice.....14. *B. utilis.*

*Leaves stipulate ; stipules more or less persistent ; leaves more or less hairy :

Leaflets 10 or more pairs (see Sect. 1) 7. *B. Woodiana* and 8. *B. Wildemaniana.*

Leaflets fewer than 10 pairs ; indumentum of leaf-rhachis generally composed of white hairs :

Leaflets subglabrous except on the midrib.....15. *B. Bragaei.*

Leaflets pubescent above and below.....16. *B. velutina.*

Section III. Paucijugatae.

Leaf-rhachis or leaflets more or less hairy : [Species of *Isoberlinia* having leaves resembling those of *Brachystegia* would fall into this group.]

Blade of leaflet glabrous but rhachis sparsely hairy as a rule ; leaflets 2–3 pairs ; leaf rhachis channelled above.....
17. *B. mpalensis.*

Blade of leaflet more or less hairy especially on the midrib below ; leaflets 3–5 pairs ; stipels definitely persistent ; branchlets pubescent towards the extremities :

Bracteoles glabrous ; raceme few-flowered, spiciform ; leaflets chartaceous, with 6 pairs of lateral nerves, usually 3–4-jugate ; leaf-rhachis softly pubescent, sulcate.....18. *B. venosa.*

Bracteoles pubescent ; raceme densely- and many-flowered, spiciform ; leaflets subcoriaceous, usually 4- or 3- or 5-jugate, leaf rhachis and branchlets ferrugineous-tomentose.....
19. *B. Randii.*

Leaf-rhachis and leaflets glabrous :

†Leaflets rounded, truncate, or cordate at the base :

Winter bud-scales ovoid and mostly appressed-tomentellose with golden hairs ; old leaflets yellowish-green, the base

spreading from the rhachis at an acute angle; leaf-rhachis definitely grooved; inflorescence of solitary axillary spikes:

Leaflets 4–5 (rarely 6) pairs, acute; flowers very fragrant (resembles *B. Randii* which differs in that it is pubescent) 20. *B. edulis.*

Leaflets 3–4 pairs, obtuse.....21. *B. Hockii.*

Winter bud-scales more or less glabrous except for the ciliate margin; and then the hairs not golden:

Nerves arising from base of leaflet on lower side 2; venation much more prominent above than below, the reticulation of the basal nerves extending by loops to the apex on both sides of the midvein; leaflets 3-jugate, ovate-lanceolate, falcate; rhachis thickened below the juga; bark grey and smooth; buds sometimes ciliate all over, but generally glabrous and shining except for the ciliate margins.....22. *B. polyantha.*

Nerves arising from base of leaflet on lower side 2 or 3; venation prominent on both surfaces; leaflets elliptic or oblong, juga 3–5 (rarely 6).....23. *B. Oliveri.*

Nerves arising from base of leaflet on lower side 4, the innermost not generally extending to the apex; venation prominent on both sides; leaf rhachis shallowly channelled or striate; leaflets 3- (rarely 4-) jugate, variable in shape but generally falcate and asymmetrical; stipels absent and rhachis not thickened below the juga; budscales generally striated on becoming glabrous; inflorescence a panicle of spikes.....24. *B. floribunda.*

†Leaflets markedly cuneate and unequal (or very rarely subequal) at the base, penninerved, with reticulation fine..... 25. *B. appendiculata.*

1. **B. mimosaefolia** *Hutch. & Burtt Davy* in Kew Bull. 1923, 153.

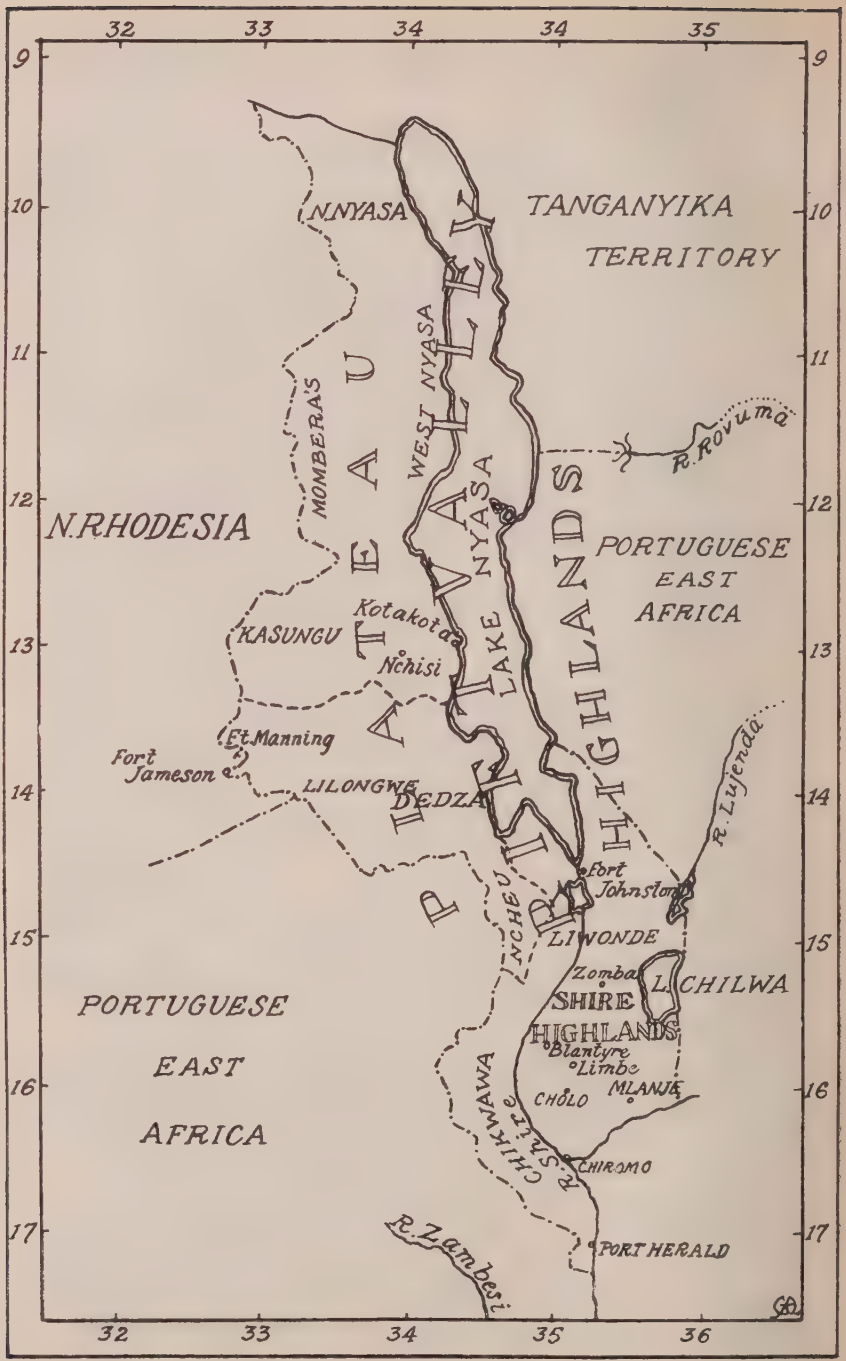
N. Rhodesia: Broken Hill, about 1300 m., flg. Sept. 1909, *Rogers* 8552 (type); Nchanga, 16 Aug. 1927, stipules persisting, *Bourne* 19!

Nyasaland: Mombera's Dist., Njuyu, about 1200 m., on sandy soil with subsoil moisture; a low spreading tree forming dense clumps, quite common in the district, but not found in other districts; 4 Nov. 1927 with flowers, young fruits, also persistent stipules, *Topham* 52! Native name: Tuunda (chiTumbuka).

2. **B. Boehmii** *Taub.* in Engl. Pfl. Ost. Afr. C: 197 (1895).

Tanganyika Terr.: Posi near Igonda, Lake Dist., *Boehm.* 159a (type).

Nyasaland: Mlanje, 950-1800 m., fl. Oct., *Purves* 194! Small tree 20–30 ft., yields bark cloth. Native name: Mjombo (chiYao: *Purves*).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TANGANYIKA
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N.RHODESIA
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PLATEAU
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R. ROVUMA
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EAST
AFRICA
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Kotakota
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Fort Jameson
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HIGHLANDS
R. Lujenda
Fort Johnston
LIWONDE
Zomba
L. CHILWA
SHIRE
HIGHLANDS
Blantyre
Limbe
MLANJE
CHOLO
NCHEU
CHIKWAWA
R. SHIRE
CHIROMO
PORT HERALD
R. Zambesi
PORTUGUESE
EAST
AFRICA

S. Rhodesia : Haroni R., at about 1650 m., *Swynnerton* 1028. Native name : Umbfuti (Chindao).

3. **B. Goetzei** *Harms* in Engl. Bot. Jahrb. 30 : 318, t. 13 (1901).

Tanganyika Terr. : Unyika, near Dorf Piseki, buschwald at 1400 m., fl. Nov. 1899, *Goetze* 1423 (type). Native name : Nguanzo (Tanganyika).

Nyasaland : S. Province, *Carver* 18 ! Dedza Escarpment, W. side of Rift valley, at 1600 m., tree much attacked by wax scale, 13 Sept. 1929, *Burtt Davy* 1642/29 ! Ncheu Dist., M'mawa's village, road from Ncheu to Ft. Johnston, 16 Sept. 1929, *Burtt Davy* 1731/29 ! Ft. Johnston District, escarpment on E. side of Rift Valley, beside road to Namwera, at 1000 m., *Burtt Davy* 1774/29 ! Native names in Nyasaland : Mombo (chiChewa), Mjombo (chiYao).

4. **B. flagristipulata** *Taub.* in Engl. Pfl. Ost. Afr. C. 198 (1895).

Tanganyika Terr. : Usaramo, 1894, *Stuhlman* 6400 ! (type) ; *Stoltz* 1757 (not perfectly matched) ; without precise locality, *Hendry* in Forestry herb. 525 ! Native name : Muyenzi (Myombo, *Hendry*).

N. Rhodesia : Serenje, 23 Aug. 1927, *Bourne* 87 !

Nyasaland : Lake Nyasa, in fruit only, *Archdeacon Johnston* 313 ! (considered to belong here) ; Ncheu District, upper Livulezi valley, provides poles and bark lashings, flowers finished but some stipules fallen others persisting, 22 Jan. 1928, *Topham* 82 ! Native name : Mombo (chiNyanja and Dedza, chiChewa) ; Champira Hill, Kasungu Dist., about 1000 m., growing in *Brachystegia* forest, provides useful bark, collected by native forester Mkwanda, July-Aug. 1928, *Topham* 143 ! Native name : Chiombo (northern chiChewa). The two last enumerated match *Johnston* 313.

5. **B. tamarindoides** *Welw.* ex Benth in Trans. Linn. Soc. 25 : 312 (1866).

Angola : Huilla, between Lopollo and the lake of Ivantala, common, occasionally constituting little woods ; " a tree 15-25 ft. high, or, in the forests free from conflagration more than 40 ft. high ; crown thyrsiform, trunk branched a little above the base, branches and branchlets subtortuose ; leaflets in the state of sleep bifariously imbricate upwards along the rhachis." (Welw.) ; fl. Oct. 1859, young fruit, Feb. 1860, *Welwitsch* 585 (type) ; wooded places on the banks of Cacolabar R., *Welwitsch* 585 b, 4157 ; Kubango, near right bank of the river near the fort Princess Amelia, fl. Oct. 1905, *Gossweiler* 2136 ; Malange Dist., *Gossweiler* 1352.

Belgian Congo : Katanga Prov., near Elisabethville, fruit Aug. 1919, *Burtt Davy* 17845, 18016, " string is prepared from the bark."

N. Rhodesia : Mazabuka Dist., Sianjalika, large tree, Aug. 1929, *Stevenson* 17 ! Ft. Roseberry, 11 Nov. 1927, *Bourne* 125 ! Native names : Mulwepa (chiTonga, *Stevenson*), Moosamba Kiloko (Katanga, *Burtt Davy*).

Nyasaland : Mombera Dist., plain S. of Choma Mt., on sandy soil in *Brachystegia* type of forest but probably with subsoil moisture, very rare and not seen in other localities, fl. 9 Nov. 1927, *Topham* 70 ! Appears to be eastern analogue of the species. Native names : Tuunda (chiTumbuka) Muhama (chiTumbuka ? chiNg'oni ? Nyasaland chiTonga ?).

This species, very rare in Nyasaland, grows in association with *B. mimosaefolia*, and the two species have been found only in one district. They are in plateau country near the Rhodesian boundary. In both species (as found in Nyasaland) the stipules are more or less persistent.

6. **B. filiformis** *Hutch. & Burtt Davy* in Kew. Bull. 1923 : 150.

N. Rhodesia : Broken Hill, about 1250 m., Nov. 1909, *Rogers* 8605 (type) ; Mazabuka Dist., Sikasondasima, 22 Apr. 1929, a large tree, *Stevenson* 35 !

S. Rhodesia : Haroni R., about 1800 m., fruit Sept. 1906, *Swynnerton* 1028 ; Victoria Falls, in Sandveld, *Burtt Davy* 17831. Native names : Mubombo (chiTonga, *Stevenson*), Umbfuti (Chindao), Amachibero (Mashona), Mbombo (chiLundi), Moo samba (chiKaundi).

Nyasaland : Dedza Dist., cross roads at Mphunzi, 1200 m., 12 Sept. 1929, *Burtt Davy* 1606/29 ! 1607/29 ! S. Nyasa Dist., beside the road Ft. Johnston to Namwera (E. side of Rift valley), 800 m., 17 Sept. 1929, *Burtt Davy* 1778/29 ! Liwonde Dist., 23 miles by road S. of Nyenyezi Estate, 18 Sept. 1929, *Burtt Davy* 1831/29 ! 1833/29 ! Liwonde Dist., by road between Liwonde and Zomba, 18 Sept. 1929, *Burtt Davy* 1841/29 ! 1843/29 ! 1848/29 ! Zomba Dist., foot of kopje in Lake Chilwa plain, about 600 m., *Burtt Davy* 1905/29 ! 1906b/29 ! Blantyre Dist., Shire Highlands near Mpemba Hill, *Burtt Davy* 1938/29 !, Mlanje Dist., Tuchila plain, 900 m., *Burtt Davy* 1960/29. Native names : Mumba (Kota Kota, ex Kew Bull. 1923), Musumbu (chiNyanja, ex Kew Bull. 1923 ; the name is used by northern Achewa for similar trees), Mombo (chiChewa and chiNyanja), Mjombo (chiYao).

Tanganyika Terr. : Dar-es-Salaam Dist., Masanganya Reserve, at 300 m., *L. T. Wigg* 382 ! " large tree growing in the poorer soils on the low ground below hills covered with good forest of *Afzelia* and *Trachylobium* ; its associates are Myombo Nkhaka and Myombo Botha (*B. euryphylla*) and *Pterocarpus Bussei* forming dry forest ; used for making bark corn-bins." Native name : Myombo Luhombo (Kisaramo).

7. **B. Woodiana** *Harms* in Engl. Bot. Jahrb. 30 : 82 (1901) ; *B. oblonga* Sim For. Fl. Port. E. Afr. 49 (1909).

Tanganyika Terr. : Keegwah, lat. 5°5 S. long. about 32° E., about 1300 m., *Speke & Grant* 1.

Portuguese E. Africa : Quelimane, Magenja da Costa and around Arenga, a common medium-sized tree, *Sim* 5574.

S. Rhodesia : Salisbury, a fine tree, *Rand* 554.

Belgian Congo : Elisabethville, *Burtt Davy* 18017 (may belong here).

Nyasaland : Shire Highlands, *Buchanan* in herb. Wood 6960 (type) ; *Buchanan* 334 in herb. Mus. Brit. ; Mombera's Dist., Kasitu River valley, Samson's village, fl. and fruit, 30 Oct. 1927, *Topham* 66 ! Dedza Dist., near Mphunzi, fl. 24 Sept. 1928, *Topham* 127 ! same locality, 11 Sept. 1929, *Burtt Davy* 1608/29 ! Zomba Dist., *Burtt Davy* 1896/29 ! Lilongwe Dist., Likasi Valley, near Mbabazi, fl. 6 Oct. 1927, *Topham* 48 ! Native names : Mecombo (*Speke & Grant*), Modi (*Sim*), Machabel (*Rand*) ; in Nyasaland : Mjombo or Njombo (chiYao), Mombo (chiChewa and chiNyanja), Chiombo (chiTumbuka).

In Nyasaland the bark is one of the best for the many uses it is put to. In addition, according to Speke and Grant, it is used to make canoes ; they further mention that the tree has sensitive leaves, a feature not noted, or looked for, in Nyasaland. Rand states that the pods are a favourite food for the elephant.

8. **B. Wildemaniana** *R. E. Fries* in Wiss. Ergeb. Schwed. Rhod.-Kongo-Exped., 1911-12, 1 : 68 (1914).

Rhodesia : N.E. Rhodesia ; Malolo-Katewe between Lakes Bangweolo and Tanganyika, fl. Nov. 1911, *R. E. Fries* 1204 (type).

The following are believed to belong to this species, but I have not seen the type.

Nyasaland : Dedza Dist., Dedza Escarpment, W. side of Rift valley, 1000 m., a coppice shoot, 13 Sept. 1929, *Burtt Davy* 1654/29 ; Ncheu Dist., Foothills to escarpment, W. side of Rift valley, 19 miles S. of Namikokwe drift, Mua-Zomba road, coppiced tree 20 ft. high, 16 Sept. 1929, *Burtt Davy* 1729/29 ; S. Nyasa Dist., road Ft. Johnston to Namwera, on escarpment 800 m., E. side of Rift valley, 17 Sept. 1929, *Burtt Davy* 1777/29. Cholo Dist.? Chinkwania Village on Cholo-Chiromo road, 300 m., *Burtt Davy* 2221/29 ! 2222/29, 2223/29. Native names : Mombo (chiChewa and chiNyanja), Mjombo (chiYao).

9. **B. Bournei** *Greenway*, Kew Bull. 1928, 200.

N. Rhodesia : Nchanga, leaves and fruit only, *Bourne* 78 (type) ! Native name : Muwombo (chiLamba, chiWamba).

Nyasaland : Dedza Dist., one mile W. of Mphunzi Hill, an old Lilongwe road, locally common, yields bark string, fl. and fruit 23 Sept. 1928, *Topham* 124 ! Linthipe valley road 12 miles from Dedza, 11 Sept. 1929, *Burtt Davy* 1605/29 ! Native name : Mombo (chiChewa).

10. **B. longifolia** *Benth.* in Hook. Ic. Pl. 14, t. 1359 (1881).

Nyasaland : Shire Highlands, *Buchanan* 22 (type) ! 217 (in part, in Herb. Mus. Brit.), " a bark cloth tree " with soft wood ; Dedza Dist., near Linthipe drift about 1200 m., common in locality, 17 July 1927, *Topham* 19 ! Lilongwe Dist., Dzalanyama reserve near Katete river, bark of very good quality, fl. 29 Sept. 1927, *Topham* 44 ! Ft. Manning Dist., beside main road to Lilongwe

2 miles E. of turning to Likasi estate on boundary of N. Rhodesia, growing in much-mixed type of retrogressive *Brachystegia* forest, about 1200 m., yields very good bark cloth, 2 Sept. 1929, *Burtt Davy* 1097/29 ! Dedza Dist., Dedza, foot of granite kopje near Angoni Highlands hotel, about 1600 m., 9 Sept. 1929, *Burtt Davy* 1458/29 ! 1460/29 ; Dedza Dist., Linthipe valley road 12 miles from Dedza, about 1300 m., 12 Sept. 1929, *Burtt Davy* 1610/29 !

A form of the same species with abnormally broad leaflets has been collected in Dedza Dist., W. side of Mphunzi Hill, locally common, 5 July 1928, *Topham* 2 ! Dedza escarpment, W. side of Rift valley, 1100 m., a coppice shoot, 13 Sept. 1929, *Burtt Davy* 1647/29 !

What is probably the same species was collected in the Zomba Dist., Lake Chilwa plain, 650 m., young foliage, *Burtt Davy* 1909/29. Native names : Mombo (chiChewa at Dedza and chiNyanja), Msanga (chiChewa in North, but possibly given in error), Mvukwe (chiYao, probably in error), Mjombo (chiYao, *Buchanan*).

11. **B. longifolia** var. **parvifolia** *Topham* var. nov.—Leaflets only 8 pairs, smaller than in the typical form.

Nyasaland : Kopje near Dedza hotel, about 1600 m., 9 Sept. 1929, *Burtt Davy* 1457/29 ! (type) 1461/29 ! Dedza Dist., Linthipe valley road 12 miles from Dedza, 11 Sept. 1929, *Burtt Davy* 1604/29 ! S. Nyasa Dist., W. side of Rift valley, Nyenyezi Estate, about 1000 m., 18 Sept. 1929, *Burtt Davy* 1803/29 ; Kasungu Dist., Chimaliro hills, " useful for bark cloth," sent by native forester Mkwanda. Native names : Mjombo (chiYao), Mombo (chiChewa and chiNyanja), Chitawe (northern chiChewa).

12. **B. apertifolia** *Hutch. & Burtt Davy* in Kew Bull. 1923, 154.

Belgian Congo : Dilolo, June 1908, *Sapin.*

Angola : Pedras de Guinga, between Condo and Quisonde, fruit March 1857, *Welwitsch* 571 (may belong here). Native name : Moozamba.

Nyasaland : Ntondwe, *Cameron* 134 (type) ! Dedza escarpment, W. of Rift valley, 1450 m., 13 Sept. 1929, *Burtt Davy* 1646/29 ! Dedza 1 mile west of Mphunzi Hill, 1300 m., 23 Sept. 1928, *Topham* 125 ! Native names : Nangwesu (chiYao ; probably given incorrectly) ; Mombo (chiChewa, Dedza).

This species has a strong affinity with *B. longifolia* Benth. but is more or less hairy.

13. **B. leonensis** *Hutch. & Burtt Davy* ? in Kew Bull. 1923, 156. Specimens which appear to belong to this species have been collected as follows :—

N. Rhodesia : Mazabuka Dist., Chisuwoa, Aug. 1929, *Stevenson* 43 !

Nyasaland : Dedza Escarpment, 1500 m., on edge of a gully, 13 Sept. 1929, *Burtt Davy* 1630/29 ! Ncheu Dist., M'mawa's village, road from Ncheu to Ft. Johnston, 16 Sept. 1929. *Burtt Davy* 1742/29 ! 1745/29 ! Cholo Dist., Limbe road 15 miles S. of Limbe, 1100 m.,

good bark cloth, 27 Sept. 1929, *Burtt Davy* 2209/29 ! Native names : Kamponi (chiChewa, Dedza), Mchenga (chiYao, chiNyanja).

14. **B. utilis** *Hutch. & Burtt Davy* in Kew. Bull. 1923, 155.

Belgian Congo : Katanga Prov., Kimbaembe R. near Elisabethville, fruiting Aug. 1919, *Burtt Davy* 17962.

Angola : Huilla, between Mumpulla and Nene, a small tree, *Welwitsch* 584.

Portuguese E. Africa : Mozambique Terr., Mosurizi, up to 1300 m., fruit Feb. 1907, *W. H. Johnson* 105.

N. Rhodesia : Serenje, 23 Aug. 1927, *Bourne* 84 ! Lusaka, *Bourne* 63 !

Nyasaland : Mlanje, about 1000 to 1600 m., fl. Oct. 1905, *Purves* 193 (type) ; Zomba and vicinity, 800 to 1250 m., fl. Dec. 1896, *Whyte* ! Dedza Dist., Linthipe, fruit 17 July 1927, *Topham* 23 ! Mombera's Dist., Njuyu Hill, fl. 4 Nov. 1927, *Topham* 54 ! Kasunga Dist., Chimaliro Hills (sent by native forester Mkuanda) 1928, *Topham* 140 ! Kota Kota Dist., Nchisi, below the rest-house, about 1700 m., 6 Sept. 1929, *Burtt Davy* 1326/29 ! 1328/29 ! 1330/29 ! extremely variable in leaves and in the pods ; a little lower down the mountain in the same locality, 7 Sept. 1929, *Burtt Davy* 1411/29 ! Dedza Dist., Linthipe Valley road 12 miles from Dedza ; 11 Sept. 1929, *Burtt Davy* 1603/29 ! 1609/29 ! Liwonde Dist., 23 miles S. of Nyenyezi Estate, 18 Sept. 1929, *Burtt Davy* 1836/29 ! Cholo Dist. ? Shire Highlands, 27 Sept. 1929, *Burtt Davy* 2200/29 ! Native names : at Nchisi given as Msenga (northern chiChewa), ChiThowe (chiTumbuka), Nangwesu (chiYao), earlier specimens at Dedza, Mombo (chiChewa), Zale (chiYao), Chiombo (chiTumbuka) ; specimen from Kasunga, Mjeye (chiYao).

This species shows very great variation owing mainly to the soil and aspect. Some vigorous shoots resembled the normal leaves of *B. velutina*, while exposed leaves from the same tree were on the same scale as in *B. tamarindoides*. Hence, no doubt, the large variety of vernacular names.

15. **B. Bragaei** *Harms* in Engl. Bot. Jahrb., 30 : 82 (1901).

Portuguese E. Africa : Beira, *Braga* 152 (type).

S. Rhodesia : Melsetter Dist., about 200 m., fl. Sept. 1907, " stamens white," *Swynnerton* 657 ! Nyahodi R., at 1650 m., *Swynnerton* 1027, Native name : Mootsatsa (*Swynnerton*).

Nyasaland : Lilongwe Dist., Dzalanyama Reserve, about 1300 m., Sept. 1927, *Topham* 98 ! Native name : Tsamba (chiChewa).

16. **B. velutina** *De Wild.* in Fedde Repert. ii : 512 (1913).

Belgian Congo : Elisabethville in 1911, *Hock* (type), in 1916, *Ringoet*, in 1919, *Burtt Davy* 17784 ; Tschinsenda, about 1400 m., fl. Oct. 1912, *Rogers* 10371.

N. Rhodesia : Serenje, 23 Aug. 1927, *Bourne* 86 !

NYASALAND : Dedza Dist., Linthipe valley, growing in mixed *Brachystegia* forest, 17 July 1927, *Topham* 24 ! Lilongwe Dist., Lilongwe R., Dzalanyama reserve, locally common, fl. 25 Sept. 1927, *Topham* 42b ! Ft. Manning Dist. on Rhodesian boundary 2 miles E. of turning to Likasi, 1250 m., 2 Sept. 1929, *Burtt Davy* 1099/29 ! Dedza Dist., foothills of escarpment near Namikokwe drift, 800 m., 14 Sept. 1929, *Burtt Davy* 1673/29 ! Native names : Mombo (general chiChewa and chiNyanja) ? Njanjobvu (chiYao—specimen at Linthipe). This species is quite common in some localities.

17. **B. mpalensis** *Micheli* in Compt. Rend. Soc. Bot. Belg. 36 : 73 (1897) ; Illustr. Fl. Cong. t. 88.

BELGIAN CONGO : m'Pala, *Descamps* 27 (type) ; m'Towa, fl. Aug. 1895, *Descamps*.

N. RHODESIA : N. W. Rhodesia, Chilanga, fl. Sept. 1909, *Rogers* 8451 ! Broken Hill, about 1300 m., *Rogers* 8608 ; N. E. Rhodesia, Serenje, 25 Aug. 1927, *Bourne* 88 ! Native names : Kapootoo (chiNyanja), Mapootoo (chi-Kaundi), Mpatchi (chiLunda) teste *Rogers*.

S. RHODESIA : Victoria, *Monro* 330.

NYASALAND : 1 June 1926, *Carver* 20 ! (a doubtful match). Native names : Tsamba (chiNyanja) Msumbuti (chiYao).

18. **B. venosa** *Hutch. & Burtt Davy* in Kew. Bull, 1923, 158.

N. RHODESIA : High-veld near Victoria Falls, an erect tree, fl. Sept. 1905, *Allen* 165 (type).

NYASALAND : Stevenson Road, fl. Nov., *Scott Elliot* 8380 ! 8389.

19. **B. Randii** *Bak. fil.* in Journ. Bot. 1899, 433. *B. spicaeformis* var. *parviflora* Benth. in Trans. Linn. Soc. 25, 313 (1866).

BELGIAN CONGO : Katanga Prov., near Elisabethville, *Burtt Davy* 17846b.

TANGANYIKA TERR. : Robeho, lat. 6°38′ S., alt. 4700 ft., *Speke and Grant* 32 ; Tabora Prov., Kasisi River, tree of the dry forests, at 1200 m., *L. T. Wigg* 54 ! Kashote, Kwassi Reserve, 1500 m., average-sized tree of the dry forests, *L. T. Wigg* 95 ! Forest Herb. 434 ! 530 ! Native name : Mutundu (Kinyanwezi language). The name m'Nenga given on Speke and Grant's label (see Kew. Bull. 1923 : 161) probably refers to *Pterocarpus Bussei*, according to Mr. Wigg of the Tanganyika Forest Service.

N. RHODESIA : Livingstone, *Rogers* 17456.

S. RHODESIA : Salisbury, *Rand* 610, 611 (types) ; flowers sweet-scented ; near Salisbury 1600 m., fl. Oct. 1916, *Eyles* 648 ; fl. Sept. 1917, *Eyles* 845 ! *Rogers* 5796 ; Umtali Div., Odzani R. valley, 1914, *Teague* 301 ; Victoria Falls in sandveld, *Burtt Davy* 17834, *Gibbs* 145 ; without precise locality, in 1870, *Baines* ; Queque, *Rogers* 5845 ; Sebakwe, 1350 m., fl. Sept. 1904, *Eyles* 174 ; Victoria, *Monro* 456, 468, 526, 540. Native names : Msaassa (*Rand* and *Eyles*), Mchenga or Mnenga (*Speke* and *Grant*).

Nyasaland : Mlanje plateau, 2000 m., fl. and fruit Oct. 1905. *Purves* 208 ! Mombera's Dist., Kasitu valley near Samson's village, 1200 m., fl. 30 Oct. 1927, *Topham* 68 ! Kota Kota Dist., Nchisi, about 1600 m., 5 Sept. 1929, *Burtt Davy* 1274/29 ! Dedza Dist., Dedza Escarpment, 13 Sept. 1929, *Burtt Davy* 1623/29 ! Zomba Dist., *Burtt Davy* 1870/29 ! Native names : Kamphoni (chiChewa, Dedza), Mchenga (chiYao), Mpapa (northern chiChewa), Msambuti (chiYao used at Nchisi for this or an allied species).

This species appears to be nearly identical with *B. edulis*. As grown in Rhodesia, the flowers are said to be sweet-scented (*Rand*), as also are specimens of *B. edulis* in Nyasaland. The only visible morphological difference is in the hairiness of the leaves. The Nyasaland species was not collected with scented flowers as flowering specimens were not fully developed. The bark is much used for bark cloth and bark cord, bags, etc. Rand quotes it as giving a red gum rich in tannin ; and Speke and Grant mention that their tree had a red juice.

20. **B. edulis** *Hutch. & Burtt Davy* in Kew Bull. 1923, 162.

Kenya Colony : Coast districts, in sand or sandy soil, *Battiscombe* 33 ! *Webber* 604 ; Shimba Hills, coast, *Battiscombe* 109.

Tanganyika Terr. : Nyasa Highlands, Kyimbila, about 1200 m. fl. Nov. 1910, *Stolz* 400 ! North of Magoye, on dry forest slopes of escarpment, about 1700–1900 m., fl. 20 Oct. 1929, *L. T. Wigg* 2 ! 9 ! Junga Prov., Tukuyu, dry forest in Nyasa Trough, 840 m., fl. 10 Oct. 1929, *L. T. Wigg* 34 ! 37 ! 38 ! 51 ! Native names : Muguti (Kinya Kyusa) ; Lutewere (Sangu ?).

N. Rhodesia : Highlands of Batoka country, in 1860, *Kirk* (type) ; near Muata Marija about 1300 m., *Kirk*.

S. Rhodesia : Inyamadzi valley, about 800 m., fl. 8 Sept. 1906, *Swynnerton*, 1024.

Nyasaland : Shire Highlands, *Buchanan* 210 ! Lilongwe Dist., Dzalanyama reserve, about 1300 m., fl. 25 Sept. 1927, *Topham* 43 ! (provides good tall poles) ; Mombera's Dist., Kasitu valley at Samson's about 1300 m., fl. 30 Oct. 1927, *Topham* 67 ! Dedza Dist., W. of Mphunzi Hill, about 1400 m., fls. and young green leaves, 22 Sept. 1928, *Topham* 116 ! (locally common, very fragrant) ; Lilongwe Dist., by main road 15 miles W. of Lilongwe, 3 Sept. 1929, *Burtt Davy* 1087 ! Dedza Dist., foothills near Namikokwe drift, flowers very fragrant, two specimens apparently identical but local native names differ, 14 Sept. 1929, *Burtt Davy* 1663/29 ! (bark makes poor string), *Burtt Davy* 1664/29 ! (bark makes good string), Shire Highlands, *Burtt Davy* 1923/29 !, Mlanje Dist. on Mt. Mlanje at about 1600 m., scented flowers, *Burtt Davy* 2000/29 ! 2001/29 ! 2002/29 ! 2003/29 ! 2004/29 ! 2005/29 ! 2010/29 ! 2011/29 ; 2012/29 ? 2013/29 ! (collected to show variation). Native names : Kamponi (chiChewa general, also chiTambuka), Mvukwe (at Nchisi, but probably in error), Mpapa (at Nchisi by Yaos, probably

error), Mchenga (chiYao general), Tsamba (chiNyanja in Dedza foothills) Kamponi (chiNyanja in Dedza foothills).

Bark used for cloth; seeds eaten (*Kirk*) hence the name. Native names: Mriki (Kidyo), Mriti (Suswahili), Mootsaka (*Swynnerton*), Motondo (*Kirk*).

The fragrance of the flowers, which remain open after the young leaves have turned from crimson to a fresh green, distinguishes the species completely from others except only *B. Randii*. The wood is used for hoe handles, especially by the Yao. The bark is used for bark cloth-making, and the poles are of some service.

In most of the specimens at Kew the branchlets are quite glabrous, but there is a little indumentum on *B. D. Burtt* 363 and *Stolz* 1637, while the branchlets of *Wigg* 51 are rusty-tomentose.

21. **B. Hockii** *De Wild.* in Fedde Repert. ii, 512 (1913). *B. Hockii* var. *papyracea* De Wild.; *B. trijuga* R. E. Fries; *B. mpalensis* var. *latifolia* De Wild.

Belgian Congo: Katanga, in 1911, *Hock* (type); near Lufaku, fl. Aug. 1899, *Verdick* 64; Sankesia, fl. Aug. 1911, *Bequaert* 170; Elisabethville, fruit Aug. 1919, *Burtt Davy* 17815, 17966; Elisabethville, *C. de Neuter*, without number!

Angola: Malange Dist., *Gossweiler* 1324, 1337; Kubango, *Gossweiler* 1911. Kutchi River, *Gossweiler* 3370.

N. Rhodesia: Between Luapula River and Luera River, fl. Sept. 1911, *R. E. Fries* 586; Meali, near Bangweolo Lake, Oct. 1911, *R. E. Fries* 1068; Bwana Mkubwa, Aug. 1911, *R. E. Fries* 321; Victoria Falls in sandveld, *Burtt Davy* 17835; Mazabuka Dist., Namakwanda, Aug. 1929, *Stevenson* 34! Native names: Mukutu (*Verdick*), Kaputu (*Burtt Davy*), Mushovi (*Gossweiler*), Musamba (*de Neuter*), Musewe (chiTonga, *Stevenson*).

Nyasaland: Kota Kota Dist., Nchisi, 1800 m., Sept. 1929, *Burtt Davy* 1203/29! 1275/29! same locality, 1700 m., 6 Sept. 1929, *Burtt Davy* 1337/29! consecutively to 1345/29! 1349/29! 1350/29! 1360/29! 1361/29! Same locality but altitude about 1550 m., a seedling, 7 Sept. 1929, *Burtt Davy* 1410/29! Dedza Dist., Dedza escarpment, W. of Rift valley, 12 Sept. 1929, *Burtt Davy* 1624/29 1626/29! 1627/29! 1628/29! 1631/29! 1637/29! S. Nyasa Dist., Escarpment, E. side of Rift valley, road Ft. Johnston-Namwera, 16 Sept. 1929, *Burtt Davy* 1780/29, 1789/29. Native names: Tsamba (common chiChewa and chiNyanja), Mvukwe (northern chiChewa), Mpapa (chiTumbuku, possibly in error), Msumbuti (chiYao).

This tree, at Nchisi, rapidly sent up coppice growth when protected from fire.

22. **B. polyantha** *Harms* in Engl. Bot. Jahrb. 30: 319 (1901).

Tanganyika Terr: Untali, Kivira Thal., about 1400 m., fl. Nov. 1899, *Goetze* 1478 (type).

N. Rhodesia: Chifwefwe, 21 Aug. 1927, *Bourne* 84!

Nyasaland : Kota Kota Dist., Nchisi, about 1500 m., 7 Sept. 1929, *Burtt Davy* 1408/29 ! Dedza Dist., on escarpment down to Mua, 13 Sept. 1929, *Burtt Davy* 1643/29 ! S. Nyasa Dist., E. side of Rift valley, 16 Sept. 1929, *Burtt Davy* 1739/29 ! 1744/29 ! Native names : Mseza (chiChewa, chiNyanja), Mtwana (chiYao).

This tree grows on steep hillsides, generally at from 2000 to 4000 ft., on impoverished soil. It is mostly found in pure stands, and is often of fine proportions having a clean bole for thirty feet, and is about 10 inches diameter at breast height. The very characteristic feature is the grey smooth bark. The tree is, however, of little use.

23. **B. Oliveri** *Taub.* in Pfl. Ost. Afr. C. 197 (1895).

Kenya Colony : Mombasa, *Wakefield* (type).

N. Rhodesia : Ft. Jameson, Aug. 1929, *Burtt Davy* 1009/29 ! 1045/29 ! (probably belong here).

Nyasaland : Dedza Dist., W. of Mphunzi, 5 July 1927, 1300 m., *Topham* 7 ! 8 ! (may belong here, the specimens differing from *B. floribunda* in the venation of the leaflets) ; foothills to escarpment near Namikokwe drift, 800 m., 14 Sept. 1929, *Burtt Davy* 1672/29 ! S. Nyasa Dist., E. side of Rift valley, 17 Sept. 1929, *Burtt Davy* 1779/29 ! Liwonde Dist. ? road Liwonde to Zomba, 18 Sept. 1929, *Burtt Davy* 1844/29 ! 1852/29 ! Native names : Tsamba (chiChewa, chiNyanja), Msumbuti (occasional, chiYao), Msimonje (chiYao).

24. **B. floribunda** *Benth.* in Hook. Ic. Pl. 14 : 43 (1881).

Nyasaland : Shire Highlands, *Buchanan* 10 (type) !, Dedza Dist., W. of Mphunzi Hill, 5 July 1927, *Topham* 1 ! Near Chiwao Hill, 24 June 1927, *Topham* 10 ! W. of Mphunzi H., fl. 23 Sept. 1928, *Topham* 123 ! Kota Kota Dist., Nchisi, 5 Sept. 1929, *Burtt Davy* 1276/29 ! 6 Sept. 1929, *Burtt Davy* 1327/29 ! 1346/29 ! 1347/29 ! 1348/29 ! 1351/29 ! 1362/29 ! Dedza Dist., near Hotel on granite kopje, 9 Sept. 1929, *Burtt Davy* 1456/29 ! 1459/29 ! on Dedza mountain up to 6000 ft. where it abruptly ceases, 10 Sept. 1929, *Burtt Davy* 1483/29 ! Mphunzi cross roads, 11 Sept. 1929, *Burtt Davy* 1590/29 ! 1612/29 ! (Ft. Johnson Dist., E. side of Rift valley, *Burtt Davy* 1781/29, also 1788/29 ! may belong here). Shire Highlands, *Burtt Davy* 1920/29 ! 1921/29 ! 1922/29 ! (Mlanje Dist. ?, *Burtt Davy* Cholo Dist., Cholo, *Burtt Davy* 2017/29 ! 2203/29 ! 2205/29 !, 2208/29 ! also may belong here). Native names : Tsamba (chiChewa, chiNyanja), Msumbuti (chiYao), Mphimbe (given at Dedza by Chewa), Mpapa (chiTumbuka, also at Nchisi by Chewa).

Tanganyika Terr. : north of Magoye, in dry forest on slopes of scarp, at about 1700 m., the plateau above with temperate rain-forest remnants at 1910 m., the plains below with *Acacia*-tall grass savannah at 960 m., fl. 20 Oct. 1929, *L. T. Wigg* 1 ! Magoye Basin, edge of scarp, at about 1900 m., *L. T. Wigg* 8 ! Native name : Kipabasi (Sangu ?).

On the upper part of the Dedza escarpment this tree, when left uncut, is conspicuous as a small tree forming almost thickets

in such places as burial grounds, in otherwise bare country. The bark is of some use for lashings.

25. **B. appendiculata** *Benth.* in Trans. Linn. Soc. 25 : 313, t. 42 (1866).

Nyasaland : near Zomba and E. end of Lake Shirwa (precise locality Magamero beside water, Chirazulu Dist.) fl. Oct. 1861, *Meller* (type !) not re-collected. Native name : Chenga (*Meller*).

XLI.—ADDITIONS TO THE FLORA OF BORNEO AND OTHER MALAY ISLANDS. H. N. Ridley.

Meliaceae.

Dysoxylum Motleyanum *Ridley*, sp. nov. ; a *D. procero* Hiern affini differt foliis submembranaceis minoribus, nervis paucioribus tenuibus, panicula gracili multiramoso glabro, floribus minoribus roseis.—*D. procerum* var. *Motleyanum* C. DC. in DC. Monogr. i. 487 (1878).

Arbor mediocris glabra. *Folia* 18–20 cm. longa ; petioli 5–8 cm. longi ; foliola 2–4-juga, lanceolata, acuminata, basi obtusa, 6–14 cm. longa, 3–6 cm. lata, supra laevia subtus nervis 8-jugis tenuibus intra marginem inarcuantibus ; petioluli 3 mm. longi. *Paniculae* multiramosae, ramis 30 cm. longis patentibus gracilibus ; pedunculi nulli ; bracteae triangulares, acutae, 1 mm. longae ; pedicelli 2 mm. longi. *Flores* rosei in paribus dissitis 1 cm. remotis dispositi. *Calyx* patelliformis, 3 mm. longus, dentibus 4 acutis. *Petala* 4, lineari-oblonga, obtusa, 1 cm. longa, 3 mm. lata, extra sericea. *Tubus staminеus* cylindricus, 1 cm. longus, pubescens ; antherae 8, oblongae. *Ovarium* glabrum, 4-loculare ; stylus tenuis, ad basin hirtus. *Capsula* 5–7·5 cm. diametro, rosea. *Semina* castanea.

Dutch Borneo. S. & E. Division : Banjermasin, *Motley* 996, 1291 (type). " Second-rate tree. Flowers rose. Fruit pink, 2 to 3 inches in diameter. Seeds chestnut-brown, much eaten by pigeons."

This plant was referred by C. De Candolle to a variety of the Indian species *D. procerum* Hiern, from which (as Stapf notes on the specimens in Herb. Kew.) it is very distinct. The whole tree is smaller, the leaves quite thin and smaller and lanceolate with fewer and finer nerves, the flowers are smaller and rose pink (not white as in *D. procerum*) and the panicle is very slender and glabrous. The plant in the Kew Herbarium collected by Vriese in Java, referred to *D. procerum* by C. De Candolle, is *D. excelsum* Bl.

Dysoxylum brachystachys *Ridley*, sp. nov. ; *D. Beccariano* C. DC. affine, floribus minoribus, panicula glabra e ramorum axillis orta differt.

Arbor glabra. *Folia* 20 cm. longa ; foliola bijuga, oblonga vel ovata, cuspidato-acuminata, basi angustata, 8–10 cm. longa, 4–5 cm. lata, membranacea, nervis subtus prominulis 4-jugis ;

petioluli 5–8 mm. longi. *Paniculae* axillares, spiciformes, 1·5 cm. longae, puberulae ; pedicelli 1 mm. longi. *Flores* parvi, 2 mm. longi. *Calyx* cupulatus, 4-dentatus, puberulus. *Petala* 4, glabra. *Tubus staminеus* petalis ferme aequilongus, cylindricus, basi petalis adnatus ; antherae 8. *Discus* brevis, tubulosus. *Stylus* cylindricus, glaber, stigmate orbiculari.

Borneo. Sarawak : near Kuching, *Haviland* 2133.

This differs from *D. Beccarianum* C.DC. in the smaller flowers and glabrous panicles. In most of Beccari's plants at least, the panicles spring from the trunk or thick branches of the tree.

Dysoxylum Havilandii *Ridley*, sp. nov. ; *D. macrothyrso* Miq. affine, foliis ovatis vel oblongis subtus rufescenti-pubescentibus, panicula hirta, floribus hirtis, fructu rufescenti-furfuraceo differt.

Arbor parva. *Folia* 4-jugata, 30 cm. longa, rufescenti-pubescentia ; foliola ovata vel oblonga, acuta, basi rotundata vel angustata, 9–15 cm. longa, 6·5–7·5 cm. lata, coriacea, supra glabra, subtus rufescenti-pubescentia, nervis 9–12-jugis subtus elevatis ; petioluli 0·5–1 cm. longi. *Paniculae* laxae, elongatae, usque 30 cm. longae, ramulis gracilibus 20 cm. longis hirtis. *Pedicelli* 1 mm. longi, hirti ; bracteae minutae, lanceolatae, acutae, hirtae. *Flores* in ramulis brevibus hirtis bini oppositi dissiti. *Calyx* patelliformis, 5-dentatus, 1 mm. longus, hirtus. *Petala* lineari-oblonga, obtusa, 1·2 cm. longa, hirta. *Tubus staminеus* petalis subaequilongus, cylindricus, 1 cm. longus, hirtus, margine undulato ; antherae 8, oblongae. *Discus* cylindricus, hirtus. *Ovarium* conicum, dense appresse hirtum ; stylus basi hirtus, tubo stamineo subaequilongus, stigmate discoideo. *Capsula* subglobosa, ad basin attenuata, 4 cm. longa, 5 cm. lata, rufo-furfuracea. *Semina* 2·5 cm. longa, 1·5 cm. lata, subreniformia.

Borneo. Sarawak : near Kuching, *Haviland* 2234 (type), 2713 ; Rejang, Sibu, *Haviland* 490. " Small tree."

This tree is allied undoubtedly to *D. macrothyrsum* Miq., but differs in the round ovate or oblong leaves hairy beneath, and the hairy panicles and flowers.

Dysoxylum macrocarpum *Bl.*

Borneo. Sarawak : Baram, Entoyut River, *Hose* 470.

This plant occurs also in Java and Sumatra, but has not hitherto been recorded from Borneo. I have only seen specimens in fruit from Java, but Hose's flowering specimens fit C. De Candolle's description, and the quadrangular rachis and thick round leaflets drying pale greenish grey are very characteristic.

Chisocheton ruber *Ridley*, sp. nov. ; speciei nulli affinis, floribus rubris glabris in racemis e trunco ut videtur ortis valde distincta.

Arbor. *Folia* magna, glabra, rachide subtricostata ; foliola opposita, oblonga, acuminata, basi lata breviter subacuta, 20 cm. longa, 6·5 cm. lata, coriacea, nervis tenuibus vix elevatis 12-jugis ; petioluli validuli, 6 mm. longi, omnino glabri. *Racemi* e trunco orti, breves, densi, 3·5–5 cm. longi, rachide pubescente ; pedicelli

1–3 mm. longi, pubescentes. *Calyx* glaber, campanulatus, dentibus 5, obscuris. *Petala* 6, rubra, lineari-oblonga, superne dilatata, 2 cm. longa, glabra. *Tubus stamineus* petalis brevior, 6-dentatus, intus et extra hirtus ; antherae 10, oblongae. *Discus* minimus, obscurus. *Ovarium* conicum, appresse hirtum ; stylus hirtus.

Borneo. Sarawak : Mt. Braang, 800 feet, limestone, *Haviland* 594. " A tree ; corolla red."

This plant is remarkable for its glabrous oblong opposite leaflets and its red flowers in short racemes borne on a small boss on the trunk or a big branch.

Chisocheton setosus *Ridley*, sp. nov. ; *C. pendulifloro* Planch. affinis, foliis oblongis utrinque setosis, rachide setosa, corolla glabra duplo longiore distincta.

Frutex vel *arbor*. *Foliola* oblonga subabrupte cuspidato-acuminata basi cuneata 33 cm. longa 8 cm. lata, membranacea omnino setosa, nervis circiter 25-jugis tenuibus subtus elevatis ; petioluli 1 cm. longi, setosi. *Panicula* 30 cm. longa, rachide setosa, ramis 1 cm. longis, 9–15-floris dissitis setosis. *Pedicelli* 2 mm. longi setosi. *Calyx* infundibuliformis setosus 3 mm. longus, margine obscure dentato. *Petala* 6, glabra lineari-spathulata 2·5 cm. longa. *Tubus stamineus* petalis brevior cylindricus ad apicem hirtus, aliter glaber, dentibus bidenticulatis, antheris 8 inclusis. *Discus* brevis cupulatus glaber. *Stylus* gracilis hirtus, stigmate capitato.

Borneo. Brunei : Limbang, *Haviland* 598.

A most distinct plant in its densely bristly leaves and panicle. The long corolla is quite glabrous. The actual size of the leaves and the number of leaflets I cannot judge of, as I have only seen two leaflets and a short part of the rachis, nor do I know whether it is a tree, or a shrub like *C. penduliflorum* Planch., to which it appears to be allied, differing in its larger leaflets densely bristly on both sides and its much larger glabrous corolla.

Chisocheton illustris *Ridley*, sp. nov. ; a *C. amabili* Miq., cui affinis (e descriptione), foliis floribusque multo majoribus et hirtis differt.

Arbor. *Folia* 35 cm. longa, rachide pubescente. *Foliola* 7-juga oblonga vel ovata inaequilateralia 11–16 cm. longa, 4·5–8·5 cm. lata, cuspidata cuspide obtusa 1 cm. longa, basi rotundata, coriacea, nervis 8–10-jugis cum costa subtus elevatis hirtis. *Petioluli* 2–5 mm. longi hirti. *Panicula* 35–45 cm. longa rachide angulato hirto ; rami plerumque breves inferiores 6–9 cm. longi ; pedunculi 20 cm. longi. *Flores* congesti albi pedicellis 5 mm. longis pubescentibus. *Calyx* cupulatus hirtus 3 mm. longus, margine obscure 4-lobo. *Petala* 6, linearia obtusa 1·7 cm. longa 2 mm. lata, parce pubescentia. *Tubus stamineus* 1·2 cm. longus extra glaber intus hirtus, dentibus 5, antheris 10. *Discus* pulviniformis glaber. *Ovarium* conicum. *Stylus* gracilis 1·6 cm. longus pilis appressis tectus, stigmate parvo capitato.

Borneo. Sarawak: Kuching, *Haviland* 2854 (type), 597; Rejang, Matu, 2853; Sibu river, 1883. "Calyx green, petals white."

Probably most nearly allied to *C. amabilis* Miq., but differing in the much larger size of leaves and flowers and in their hairiness. In some respects its affinity might be with *C. macrophyllus* Teysm., but the flowers are much larger.

Aglaia racemosa *Ridley*, sp. nov.; *A. elaeagnoideae* Benth. affinis, sed foliolis majoribus nec subtus lepidotis, floribus in racemis brevibus paucifloris raro ramosis distincta.

Arbor. Rami lepidoti. *Folia* 18 cm. longa; petioli 4 cm. longi lepidoti. *Foliola* 5, elliptica, 9–12 cm. longa, 4·5–5 cm. lata, cuspidata cuspide obtusa angusta 1·5 cm. longa, coriacea glabra haud lepidota, nervis 5–6-jugis, supra depressis subtus elevatis; petioluli 5 mm. longi. *Racemi* vel *paniculae* axillares 3–4 cm. longi, pauciflori; rachides canaliculati lepidoti; pedicelli 2 mm. longi longitudinaliter canaliculati. *Sepala* 5, ovata rotundata pubescentia. *Petala* 5, alba rotundata glabra. *Tubus stamineus* glaber, antheris minutis inclusis.

Borneo. Sarawak: Kuching, *Haviland* 1781. "Petals white, anthers sessile on a tubular column, ovary 3-celled with 1 ovule."

Undoubtedly allied to *A. elaeagnoidea* Benth., but the leaves are larger and more rigid and there is no trace of scales on the adult ones at all. The leaf-buds, stem, petioles and inflorescence are lepidote. The flowers, 2 mm. long, are borne in lax racemes of about 6, but occasionally the inflorescence has a few branches.

Aglaia cuspidella *Ridley*, sp. nov.; *A. odoratissimae* Bl. affinis, sed foliis parvis ellipticis longe cuspidatis coriaceis, floribus minoribus distincta.

Arbor. Rami graciles, cortice pallido. *Folia* 4 cm. longa glabra. *Foliola* bijuga elliptica longe cuspidata cuspide 1·5 cm. longa, basi obtusa, 5–8 cm. longa 2–5 cm. lata, coriacea; nervi superne inconspicui 5-jugi subtus vix elevati; petioluli 3 mm. longi. *Paniculae* 9–13 cm. longae, ramis inferioribus 2·5–4 cm. longis, furfuraceis. *Flores* complures perparvi; pedicelli 1 mm. longi; bracteae lanceolatae acuminatae. *Calyx* 5-lobus lobis acutis hirtis. *Petala* 5 oblonga glabra. *Tubus stamineus* petalis paullo brevior, antheris 6.

Borneo. Sarawak: Mt. Koum, *Haviland* 1706.

Very distinct in its elliptic long cuspidate leaves. The flowers are very young in all the specimens.

Aglaia Havilandii *Ridley*, sp. nov.; ab *A. mucronulata* DC. foliolis alternis, paniculis brevioribus nec lepidotis, calyce pubescente, petalis minoribus, antheris inclusis differt.

Arbor. Folia trijuga 15 cm. longa; rachide furfuraceo-puberula, foliola alterna coriacea elliptica cuspidata basi cuneata, 9–13 cm. longa, 4–5 cm. lata, glabra, supra laevia; costa subtus furfuracea elevata, nervis elevatis furfuraceis vel glabris 8–9-jugis; petioluli

validuli 1 cm. longi furfuracei. *Paniculae* axillares 12 cm. longae, furfuraceo-pubescentes, ramis 4 cm. longis. *Pedicelli* dissiti 1 mm. longi, furfuracei. *Calyx* 4-partitus, lobis lanceolatis pubescentibus. *Petala* oblonga obtusa 1 mm. longa glabra. *Tubus stamineus* petalis subaequilongus margine integer, antheris 5 inclusis.

Borneo. Sarawak: near Kuching, *Haviland* 2740, 2261.

Aglaia trimera *Ridley*, sp. nov.; ab *A. tripetala* Merrill foliolis haud falcatis nec basi inaequilateralibus, petalis multo minoribus differt.

Arbor glabra. *Folia* 30 cm. longa, rachide glabra; foliola 3–8, alterna vel subopposita oblonga vel elliptica, 8–12 cm. longa, 4·5–5·5 cm. lata, cuspidata (cuspide 5–15 mm. longa) coriacea glabra, nervis 7-jugis subtus tenuibus elevatis supra depressis; petioluli 5–1·5 cm. longi. *Paniculae* 24 cm. longae, ramis 5 cm. longis dissitis, ramulis 1 cm. longis paucifloris squamosis; pedicelli 1 mm. longi. *Calyx* patelliformis, lobis 3 rotundatis squamosis. *Petala* 3, oblonga rotundata 1 mm. longa, extra lepidota. *Tubus stamineus* subcylindricus petalis ferme aequilongus, margine obscure crenulato, antheris 6 inclusis. *Fructus* globosus rufo-furfuraceus 1·5 cm. diametro.

Borneo. Sarawak: Kuching, *Haviland* 2847; *Beccari* 1194 (fruit).

Allied to *A. tripetala* Merrill, but the leaves are not opposite nor falcate nor is the base inaequilateral, the petals are smaller and the staminal tube is not three-lobed.

Aglaia Fraseri *Ridley*, sp. nov.; *A. ellipticae* Bl. affinis sed panicula laxa subglabra, floribus multo minoribus, antheris 5 distincta.

Arbor glabra. *Folia* rachide parce rufo-furfuracea 20 cm. longa; foliola 7 imparipinnata opposita lanceolata obtusa breviter acuminata basi angustata, 9–11·5 cm. longa, 3·5–4 cm. lata, subcoriacea, glabra, nervis 9-jugis tenuibus subtus elevatis, costa parce rufo-furfuracea; petioluli 5 mm. longi pubescenti-furfuracei. *Paniculae* longiores laxae multiflorae 25 cm. longae, rufo-furfuraceae: pedicelli 1 mm. longi pubescentes. *Calyx* 4-lobus lobis lanceolatis hirtis. *Petala* 5, vix 1 mm. longa, glabra ovata rotundata. *Tubus stamineus* cupuliformis antheris 5 margini crenulato adnatis.

British North Borneo. Kudat, *Fraser* 239.

This belongs to Section *Hearnia*, with the anthers projecting from the mouth of the staminal tube, which is thickened underneath each one. It is as near *A.* (*Hearnia*) *elliptica* Bl. as any species, but the leaves are smaller, as are the flowers, which are in quite lax panicles, much less hairy than in the latter species.

Aglaia Motleyana *Stapf* ms., sp. nov.; ab *A. eduli* Miq. affini foliis alternis dissitis ovatis, paniculis longioribus nec hirtis, calyce majore diversa.

Arbor parva. *Rami* glabri lenticellati. *Folia* 5–8-foliolata, 20 cm. longa glabra ; foliola alterna ovata acuminata basi rotundata, 11·5 cm. longa 5 cm. lata, chartacea glabra, nervis 8–9-jugis subtus elevatis ; petioluli 5 mm. longi. *Paniculae* laxae 30–33 cm. longae, ramis 15 cm. longis, ramulis 4 cm. longis, furfuraceis ; pedicelli 1 mm. longi. *Calyx* cupulatus, 1 mm. longus, pubescens, obscure 5-lobus lobis obtusis. *Petala* 5, citrina, obovato-rotundata, 2 mm. longa, glabra. *Tubus stamineus* liber, petalis brevior, obscure 5-lobus, antheris 5.

Borneo. Labuan, *Motley* 225. "A small tree; flowers citron-yellow, very fragrant."

This plant Hooker made a variety of *Milnea edulis* Roxb. (*Aglaia edulis* Miq.) (in Trans. Linn. Soc. xxiii. 164), from which it is distinct in its remote ovate leaves, scurfy but not hairy panicle, and calyx larger in proportion to the corolla.

Aglaia polyantha *Ridley*, sp. nov. ; ab affini *A. Moultoni* Merrill rachide pubescenti-velutina, panicula patente, floribus majoribus, calycis lobis rotundatis differt.

Arbor. *Folia* 15 cm. longa, rachide pilis stellatis velutina ; foliola 5, lanceolata vel oblonga acuminata basi cuneata (interdum oblique), 7–15 cm. longa 3·1–5·2 cm. lata, tenuiter coriacea, nervis 6–8-jugis costa subtus pubescente aliter glaberrima nitida, reticulationibus in utraque pagina elevatis ; petioluli 3–5 cm. longi velutini. *Paniculae* laxae multiflorae multiramosae 15 cm. longae ; rami 5–12 cm. longi pilis stellatis velutino-pubescentes ; ramuli 5–10 mm. longi. *Flores* racemosi, pedicellis 2 mm. longis. *Calyx* patelliformis, lobis 5 rotundatis pubescentibus marginibus ciliatis. *Petala* glabra oblongo-rotundata 2 mm. longa. *Tubus stamineus* petalis paullo brevior, antheris 5 inclusis.

Borneo. Sarawak : Kuching, *Haviland* 3200 (type). British North Borneo : East Coast, *Creagh*.

This seems to be most closely allied to *A. Moultoni* Merrill, differing in the velvety pubescent leaf-rachis and petiolules, the lax panicles (one of which is 15 cm. long and 20 cm. wide), the deeply lobed calyx with rounded, not acute, lobes, and the larger petals.

Aglaia unifoliolata *Ridley*, sp. nov. ; foliis unifoliolatis, paniculis brevibus laxis hirtis, floribus parvis, antheris 3 in tubo libero, ab omnibus distincta.

Arbor. *Rami* glabri cortice pallido. *Folia* unifoliolata elliptica cuspidata (cuspide 8 mm. longa obtusa) 5–9 cm. longa 2·5–4 cm. lata, coriacea glabra, nervis 8–9-jugis in utraque pagina elevatis reticulationibus etiam elevatis ; petioli 7 mm. longi. *Paniculae* axillares graciles laxae 6–8 cm. longae rufo-tomentosae, ramis paucis 5 cm. longis vel minoribus. *Flores* dissiti ; pedicelli hirti 4 mm. longi vel breviores ; bracteae lanceolatae acutae minutae rufo-tomentosae. *Calyx* 4-lobus lobis ovato-lanceolatis acutis rufo-tomentosis. *Petala* 4, obovata obtusa 1 mm. longa glabra

citrina. *Tubus stamineus* subglobosus liber, margine integro; antherae 3 sessiles.

Borneo. Sarawak: Kuching, *Haviland* 2849. "Petals yellow."

This is noticeable from its simple leaves and short, hairy panicles, and from the staminal tube obovoid with a small round aperture at the top. In all the flowers which I examined I could see but three stamens.

Aphanamixis grandifolia *Bl.*

Borneo. British North Borneo: Kudat, *Fraser* 187. Sarawak: *Beccari* 3967.

Aphanamixis pedicellata *Ridley*, sp. nov.; ab *A. sumatrana* (Miq.) Harms, cui affinis, panicula graciliore, pedicellis longioribus, sepalis ovatis, antheris 5, capsula et seminibus majoribus, distincta.

Arbor parva. *Folia* 25–40 cm. longa glabra; foliola 9 imparipinnata oblonga vel elliptica, cuspidata, basi obliqua cuneata, 13–15 cm. longa 6 cm. lata, coriacea, nervis 10-jugis intra margines inarcuatis, subtus conspicuis; petioluli 1·5 cm. longi. *Paniculae* 45 cm. longae, pedunculo 15 cm. longo, ramis gracilibus dissitis 13 cm. longis. *Racemus femineus* 45 cm. longus; flores remoti alterni; pedicelli 5 mm. longi. *Sepala* 5, ovata obtusa rotundata ciliata basi connata. *Petala* 5, ovata rotundata 5 mm. longa glabra. *Antherae* 5, anguste ellipticae acutae. *Pistillodium* minutum triquetrum. *Capsula* globosa 3 cm. longa. *Semina* oblonga 1·5 cm. longa castanea.

Borneo. Sarawak: *Beccari* 3566; Kuching, *Haviland* 2089, 2132 (type). "Small tree; buds purple, inner petals white, outer petals yellow."

This species is distinct from all in the area in its long flower-pedicel; in all the others described the flowers are sessile or subsessile. *A. sumatrana* (Miq.) Harms has the most distinctly pedicelled flowers, but the pedicels in this are very much shorter and thicker. *A. pedicellata* also differs in the more slender panicle branches, the rounded calyx lobes less deeply cut, the larger fruits and seed, and by its 5 stamens.

Walsura borneënsis *Merrill.*

Borneo. British North Borneo: Sandakan, Myburgh Province, *Elmer* 20167.

Walsura multijuga *King.*

Borneo. Sarawak: Kuching, *Haviland* 1980. "Small tree; flowers pale green."

Walsura grandifolia *Ridley*, sp. nov.; *W. neurodi* Hiern affinis sed foliis in genere maximis, paniculis longioribus, floribus majoribus distincta.

Arbor parva. *Folia* 5-foliolata, glabra; petioli crassi, 10 cm. longi, superne plani, basi dilatati; foliola opposita, glabra,

rigide coriacea, elliptica, breviter acuminata, basi cuneata; foliolum terminale obovatum, 21 cm. longum, 10 cm. latum; inferiora 20–28 cm. longa 9 cm. lata; nervi 12–15-jugi, superne depressi, subtus valde elevati; petioluli foliolorum inferiorum 2 cm. longi, crassi, apice incrassati; petiolulus folioli terminalis 5 cm. longus. *Panicula* laxa, 35 cm. longa; pedunculus 15 cm. longus; rami remoti, basales 8 cm. longi, ramulis ad apicem 2·5 cm. longis paucifloris puberulis; bracteae parvae lanceolatae pubescentes caducae; pedicelli 2 mm. longi pubescentes. *Calyx* 1 mm. longus pubescens 5-lobatus lobis subtriangularibus acutis. *Petala* oblonga obtusa 4 mm. longa, pubescentia. *Tubus stamineus* quam petala paullo brevior, laciniis elongatis linearibus pilosis; antherae ovatae, acutae. *Ovarium* pilosum.

Borneo. Sarawak: near Kuching, *Haviland* 1635. "Small tree; anthers yellow, disc reddish."

Perhaps nearest to *W. neurodes* Hiern, but the leaves are very much larger, the panicles longer and laxer and the flowers larger.

Walsura Hosei *Ridley*, sp. nov.; *W. velutinae* Ridl. affinis sed ferme omnino glabra, paniculis longioribus, sepalis ad basin ferme liberis subtus rugosis marginibus ciliatis, staminum filamentis omnibus apice bifurcatis, ovario glabro.

Arbor glabra. *Folia* 15 cm. longa glabra; foliola 4 vel 5, elliptico-lanceolata acuminata subacuta, basi cuneata vel acuminata obliqua, 4–11 cm. longa 2–5 cm. lata, membranacea, nervis 6-jugis tenuibus; petioluli 3 mm. longi, terminali 1 cm. longo. *Paniculae* cymosae 8–12 cm. longae, ramis paucis ad apicem, 3–4 cm. longis, puberulis; pedicelli 1 mm. longi. *Sepala* ferme ad basin libera rotundata extra rugosa, marginibus ciliatis. *Petala* 5, oblonga obtusa 2 mm. longa glabra. *Staminum* 10 filamenta oblongo-linearia, pilis paucis infra antheras exceptis glabra, omnia ad apicem bifurcata lobis obtusis. *Ovarium* pulviniforme glabrum.

Borneo. Sarawak: Baram, Entoyut River, *Hose* 394.

Allied to *W. velutina* Ridl., but almost completely glabrous; the leaves thinner in texture; the flowers rather smaller, and globular in bud; the sepals free nearly to the base and wrinkled outside, rounded, with ciliate edges; the stamens all bifurcate at the top, and the ovary glabrous.

Walsura velutina *Ridley*, sp. nov.; *W. multijugae* King affinis sed hirtior, foliolis paucioribus, staminum petalis oppositorum filamentis integris alternis bifurcatis, ovario hirto.

Arbor pubescens. *Folia* 7-foliolata 20 cm. longa, rhachide pubescente; petioli 5 cm. longi; foliola opposita ovata vel elliptica obtuse acuminata basi obliqua, 6·5–9 cm. longa 3–4·5 cm. lata, costa nervisque 8-jugis subtus hirtis exceptis glabra; petioluli 2 mm. longi hirti. *Paniculae* axillares 5 cm. longae hirtae; bracteae ovatae acuminatae minutae; pedicelli 1 mm. longi hirti. *Flores* parvi in apicibus ramorum erectorum congesti. *Calycis* lobi 5, ovati obtusi

hirti 1 mm. longi. *Petala* 5, oblongo-ovata obtusa 2 mm. longa glabra. *Staminum* 10 filamenta oblongo-linearia intus pilosa, 5 petalis opposita apice integra, 5 alterna apice bifurcata. *Ovarium* pulviniforme hirtum, stylo brevissimo glabro, stigmate capitato.

Borneo. Sarawak: Baram district, Mt. Trekan, 2000 ft. alt., *Hose* 643 (type), 629.

This is allied to *W. multijuga* King but has fewer leaflets, and the whole plant is more hairy.

Chukrasia tabularis *Juss.*

Borneo. Sarawak (?): Limestone Hills near Ban, *Haviland* 2074. "A large tree."

Dichapetalaceae.

Dichapetalum gelonioides *Engl.*—*Chailletia sumatrana* Miq.

The Sumatran plant seems to me hardly different from some specimens of the Indian *gelonioides* and I can hardly separate *D. borneënse* Merrill.

Dichapetalum Beccarianum (*Stapf* ms., sub *Chailletia*) *Ridley*, sp. nov.; a *D. deflexifolio* Turcz., cui affinis, foliis glabris nitidis, floribus minoribus, pedunculis brevioribus differt.

Frutex scandens; rami glabri. *Folia* elliptica vel oblonga acuminata basi cuneata, 9·5–12 cm. longa 4·5–5 cm. lata, coriacea, supra glabra nitida subtus in costa parce hirta, nervis 4–6-jugis procul a margine inarcuantibus reticulationibus conspicuis; petioli rufescenti-velutini 5–10 mm. longi. *Cymae* in axillis binae flavo-hirtae, pedunculis 1 cm. longis, ramis 1 cm. longis patentibus, ramulis 5 mm. longis. *Flores* parvi. *Sepala* ovata rotundata extra albo-lanuginosa. *Petala* unguiculata oblonga biloba, lobis obtusis. *Staminum* filamenta filiformia, glandulis ad bases 2. Ovarium conicum hirtum, stigmate capitato. *Fructus* 1–2-seminifer obovatus rugosus flavo-velutinus 1 cm. longus 1·5 cm. latus.—*Chailletia timorensis* Becc. in Malesia i. 176, not of DC.

Borneo. Sarawak: Rejang river, *Beccari* 3892; nr. Kuching, *Haviland and Hose* 3365; Landak, *Teysmann* 11265; Lundu, *Ridley* 12465.

Celebes. Penisola S.E. a Lepo-Lepo presso Kandari, *Beccari*.

There are fairly good specimens of De Candolle's Timor plant in Herb. Kew., and these are totally different from Beccari's plant. He only guessed from the description that the two plants were the same, and had not seen the Timorese plant. Beccari's plant has not hitherto been described.

In some of the Celebes forms the leaves are lanceolate, narrowed to both ends, 12 cm. long, 4·5 cm. wide. The plant is undoubtedly allied to *C. deflexifolia* Turcz., but the flowers are fewer and smaller, the peduncles slender and hairy, not velvety, and leaves glabrous.

Dichapetalum grandifolium *Ridley*, sp. nov.; speciei nulli affinis, foliis magnis glabris, cymis elongatis paucifloris ferme glabris, staminibus brevibus distincta.

Frutex glabra. *Folia* elliptico-ovata vel elliptico-lanceolata obtusa basi cuneata, 18–20 cm. longa 7·5–11·5 cm. lata, coriacea, glabra, nervis 6–7-jugis intra marginem arcuantibus subtus elevatis; petioli 1 cm. longi. *Cymae* in axillis singulae, pedunculis 3 cm. longis, ramis 2 ad apices 1 cm. longis puberulis, pedicellis 1 mm. longis. *Sepala* 5, ovata rotundata 3 mm. longa albo-pubescentia. *Petala* 5, oblanceolata sepalis paullo longiora glabra usque ad medium fissa. *Stamina* 5, petalis vix longiora. *Stylus* brevis.

Borneo. Sarawak: *Haviland* 2192.

This has the largest leaves of any Asiatic species, broad elliptic ovate with few nerves, and glabrous.

XLII.—STANDARD-SPECIES OF CERTAIN LINNEAN GENERA. M. L. Green.

I. Cotyledon.

The distribution of the Nomenclature Proposals by British Botanists submitted to the International Botanical Congress, Cambridge, 1930, has elicited a communication from Dr. H. Harms (Berlin), in which he suggests that in view of recent literature, namely, Berger's Crassulaceae in Engler, Pflanzenfamilien, 18 A (1930) it might be desirable to propose *C. orbiculata L.* as the standard-species of *Cotyledon* in place of *C. hemisphaerica* L. (See Nomenclature Proposals of British Botanists, p. 156).

C. hemisphaerica was originally chosen by the writer as it is one of the historically oldest species, being figured in Dillenius, Hortus Elthamensis, t. 95, fig. 3.

Berger, however, has transferred *C. hemisphaerica* to the genus *Adromischus* Lem. It certainly is not desirable to suggest as a standard any species which may be regarded as belonging to another genus. With this in mind, therefore, *C. orbiculata* L., is proposed as a standard in accordance with Dr. Harms' suggestion. It is one of the seven species recognized in Linn. Sp. Pl. 1753, pp. 429, 1196, and it is the only one still included in the genus *Cotyledon* by Berger.

II. Scrophulariaceae.

A paper by Dr. F. W. Pennell on the Genotypes of the Scrophulariaceae in the First Edition of Linné's Species Plantarum has recently appeared in Proceedings of the Academy of Natural Sciences of Philadelphia, lxxxii. pp. 9-26 (1930).

The type-species indicated in the paper have been carefully compared with the standard-species proposed by the writer, with the result that the latter have been found to agree with the type-species with the following exceptions.

657. **Bartsia** *L.* Sp. Pl. 602 ; Gen. Pl. ed. 5, 262. Type-species as determined by Pennell : *B. coccinea* L. Standard-species as proposed by M. L. Green : *B. alpina* L.

This example shows that it is not practicable in all cases to choose the historic type as the standard-species, as this would involve a break in historic continuity of application of the generic name. Five species were included in the genus by Linné, and of these, four have been removed to other genera, amongst them *B. coccinea* which has become *Castilleja coccinea*. If, therefore, *B. coccinea* were retained as the standard-species of *Bartsia*, it would involve highly undesirable changes in nomenclature. The suggested standard-species *B. alpina L.* is the only original species still retained in the genus with its present circumscription.

660. **Melampyrum** *L.* Sp. Pl. 605 ; Gen. Pl. ed. 5, 264.

The standard-species suggested by the writer was *M. pratense* L., one of the best known of the original species and the commonest in Sweden. Dr. Pennell points out that the historic type of *Melampyrum* is *M. arvense* L.

In Engler & Prantl, Pflanzenfam. IV. 3 B, p. 99 (1893) the genus *Melampyrum* L. is divided by von Wettstein into two sections, namely, *Obtusisepalum* Wettst., containing one species only, and *Eu-Melampyrum* Wettst., containing the remaining twenty-four species. This latter section he divides again into two groups (1) *Spicata* Wettst., containing four species of which *M. arvense* is one, and (2) *Laxiflora* Wettst., containing nineteen species including *M. pratense*. Undoubtedly the latter group is the more representative, and therefore the writer feels justified in retaining *Melampyrum pratense* L. as the suggested standard-species.

664. **Pedicularis** *L.* Sp. Pl. 607 ; Gen. Pl. ed. 5, 266.

The standard-species proposed was *P. palustris*, one of the best known of the original species. In working out the genotypes of the Scrophulariaceae, Dr. Pennell points out that *P. sylvatica* fits the generic description almost wholly, being the only species with ventricose calyx and subrotund capsule. In view of this it seems desirable to adopt *P. sylvatica* L. as the standard-species.

665. **Gerardia** *L.* Sp. Pl. 610 ; Gen. Pl. ed. 5, 266.

The standard-species chosen was *G. purpurea* L. The genotype according to Dr. Pennell is *G. tuberosa* L.

This is a further example of the type-species having been referred to another genus, and in this case to another family—*G. tuberosa* L.=*Stenandrium tuberosum* Urb. (Acanthaceae). For the same reasons as those given under *Bartsia* it is undesirable to choose the historic type as the standard-species. Therefore *G. purpurea* L. is retained as the suggested standard-species.

XLIII.—ON THE FLORA OF THE NEARER EAST: VII.*—A Contribution to our Knowledge of the Flora of Azerbaidjan, N. Persia. B. Gilliat-Smith and W. B. Turrill: II.

Zygophyllaceae.

Peganum Harmala L. Sp. Pl. 444 (1753).

Common round Tabriz, seeds, flowers white or greenish white, 12.10.29.

Distrib. Medit. Region to Cent. Asia.

This is the "rue" which is used so much in native customs. It is burnt at marriages to keep off the evil eye. It is unbiquitous round Tabriz. In Arabic it is called "Harmall," though the name is also applied to *Ruta chalepensis*. In Persian it is called "isfand" or "ispand" and is undoubtedly the important herb referred to by English authors writing on Persia as "rue" or "wild rue." In the local Azerbaidjani Turki it is known as "Üzarih." *Ruta* is locally apparently unknown as a medicinal or pot herb and has no local name. In Persian it is "Sadāb," in Ottoman Turkish "Sedef," and in Bulgarian "Sedefće." *Peganum Harmala* in Bulgarian is "Zarniš.' Around Tabriz it inhabits especially dry roadsides and cemeteries, associating with *Anabasis aphylla*.

Tribulus terrestris *L.* Sp. Pl. 387 (1753).

Near Tabriz, 11.6.27, No. 2068; garden weed, 8.27, No. 2085. Flowers yellow, from June onwards.

Distrib. Medit. Region, but now naturalized in many countries.

T. terrestris *L.* var. **grandiflora** *Turrill* var. nov.; a planta vulgare floribus luteis majoribus, petalis 7–8 mm. longis differt.

Tabriz, garden weed, 7.6.27, No. 2079; 6.27, No. 2145.

Several varieties of this species have been described but they are mostly based on fruit characters. The large flowers of our plant give a distinctive appearance to the specimens. The only other material, which I have seen, approaching that from Tabriz is a sheet in Herb. Kew. from Sardinia (E. Reverchon, s.n., Santa Teresa Gallura, par Tempio, lieux incultes, 3 Juillet, 1881). The suggestion is natural that the variety has arisen more than once in a mutational manner.

Zygophyllum Fabago *L.* Sp. Pl. 385 (1753).

Near Tabriz, 5.26, flowers white, gynaeceum red, No. 1517; 20.5.27, No. 1771.

Distrib. Medit. Region.

Rutaceae.

Ruta Buxbaumii *Poir.* Encyl. vi. 336 (1804).

Aplophyllum Buxbaumii G. Don Gen. syst. i. 780 (1831).

Along the railway, Yam, 25.7.29, flowers yellow, No. 2578.

Distrib. Balkan Peninsula east to N. Persia and south to Palestine.

*Continued from *K.B.* 1930, p. 312.

R. villosa *M. Bieb.* Flor. Taur.-Cauc. 1. 310 (1808).
Hills to the south of Tabriz, 1.6.27, flowers greenish yellow, Nos. 1918, 1919.
Distrib. Armenia, Caucasus, N. Persia.

RHAMNACEAE.

Rhamnus cornifolia *Boiss. et Hohen.* in Boiss. Diagn. Ser. I. ix. 1 (1849).
Mishou Dagh, rocks and crags, 2.9.29, No. 2633.
Distrib. E. Asia Minor, Kurdistan, Persia.

R. Pallasii *Fisch. et Mey.* Ind. Sem. Hort. Petrop. iv. 46 (1838).
Hills north of Tabriz, 24.4.29, No. 2557.
Distrib. Caucasus, Armenia, N. Persia.

ANACARDIACEAE.

Rhus coriaria *L.* Sp. Pl. 265 (1753).
Tabriz, in garden, 29.10.27, No. 2183.
Distrib. Medit. Region.

SAPINDACEAE.

Acer cissifolium *Koch* in Miq. Ann. Mus. Bot. Lugd. Bat. i. 252 (1863-64).
Tabriz, cultivated in the garden of the British Consulate, 5.26, No. 1411; 2.5.26, No. 1469. This introduced tree flourishes excellently.
Distrib. Native of Japan, now widely cultivated.

LEGUMINOSAE.

Alhagi camelorum *Fisch.* Hort. Gorenk. ed. II. 72 (1812).
Near Tabriz, 6.27, No. 1972. Flowers in June and July, fruits in August. The Turki name is "Dava oti" which means "camel weed." It is plentiful in waste places round Tabriz and also in the desert. Sometimes it appears not to flower but at other times the ruby-coloured blossoms are exceedingly plentiful.
Distrib. S. Russia east and south-east to N. Persia, Afghanistan, Cent. Asia, and N. India.

Astragalus aduncus *Willd.* Sp. Pl. iii. 1269 (1803).
Mt. Sir, Urmia district, 27.5.58, flowers pinkish-purple, No. 2290.
Distrib. Armenia, N. Persia.

A. bracteosus *Boiss. et Noë* in Boiss. Diagn. Ser. II. ii. 31 (1856).
Hills south-east of Tabriz, 25.5.27, No. 1896.
Distrib. E. Asia Minor.

A. Bungeanus *Boiss.* Flor. Or. ii. 436 (1872).
Near Tabriz, 11.4.27, flowers pinkish-purple, No. 1894; hills north of Tabriz, 24.4.29, No. 2555.
Distrib. Caucasus.

I am very doubtful if this species is really distinct from *A. aduncus* Willd., with which plant Marschall-Bieberstein, according to Boissier, confused it. In the absence of more complete material, with fruits, the exact relationships of plants of this group must remain in abeyance.

A. campylorrhynchus *Fisch. et Mey.* Ind. Sem. Hort. Petrop. 23 (1835).

Hills south of Tabriz, 12.6.28, flowers minute white, No. 2275.

Distrib. Armenia, E. Asia Minor, Afghanistan, Songaria.

A. Candolleanus *Boiss.* Diagn. Ser. I. ii. 80 (1843).

Hills north of Tabriz, 28.4.28, flowers dull pink, No. 2289.

Distrib. N. Persia.

A. Caraganae *Fisch. et Mey.* in Bull. Soc. Nat. Mosc. 1838, 344.

Urmia district, 5.26, No. 1555 ; near Tabriz, 5.27, flowers bright yellow, very showy, and sweet scented when quite fresh, No. 1903.

Distrib. Iraq, Armenia, N. and W. Persia, Talysch.

A. chrysostachys *Boiss.* Diagn. Ser. I. ii. 69 (1843).

Urmia district, south-east of the lake, 5.26, flowers golden, Nos. 1558, 1599.

Distrib. N. Persia.

A. chrysotrichus *Boiss.* Diagn. Ser. I. ii. 75 (1843).

Near Tabriz, 4.27, yellow flowers, Nos. 1891, 1892, 1908 ; hills south of Tabriz, 27.6.28, No. 2352.

Distrib. Persia.

The leaflets are more nearly glabrous in our plants than in authenticated material at Kew, but I am unable to find sufficiently important morphological differences to justify the creation of a new name. No. 2352 is a poor specimen and its identification is uncertain.

A. commixtus *Bunge* in Arb. Nat. Ver. Riga i. 246 (1847).

Hills south of Tabriz, 12.6.28, No. 2273.

Distrib. E. Asia Minor, N. Persia, Turkestan, Cent. Asia.

A. constrictus *Turrill* in Kew. Bull. 1929, 226.

Near Tabriz, 6.27, No. 1905a.

Endemic.

A. constrictus *Turrill* var. **tomentosus** *Turrill* in Kew. Bull. 1929, 227.

Near Tabriz, 6.27, No. 1905b ; 6.28, No. 2355. Flowers cream-coloured and smelling like " sweet Alyssum."

Endemic.

A. (Sect. **Rhacophorus**) **distantior** *Turrill* sp. nov. ; ab *A. Fenzlii* Boiss. foliis longioribus, foliolis distantioribus, bracteis longioribus distinguitur.

Fruticulosus erinaceus circiter 9 cm. altus, ramis brevibus spinis vetustis 1·5–4 cm. longis, crebre armatis. *Folia* 3–4·5 cm. longa,

foliolis 4–5-jugis oblongis apice acuminato-spinulosis 8 mm. longis 1·5 mm. latis adpressiuscule griseis ; stipulae lanceolatae, 1·2 cm. longae, ciliatae, dorso glabrae, ima basi dense albo-tomentosae. *Flores* rubro-purpurei, axilli 3 capitulum pauciflorum globosum formantes ; bracteae membranaceae, anguste lineares, acutae, 8 mm. longae, superne hirsutae. *Calyx* usque ad basin in lacinias fisilis, laciniis anguste linearibus 11 mm. longis albo-plumosis. *Vexillum* fere oblongum, apice rotundatum leviter emarginatum, 1·9 cm. longum, 6·5 mm. latum ; alae 1·7 cm. longae, carina 1·6 cm. longa ; petala interiora unguibus vaginae stamineae usque ad 2·5 mm. adnata. *Ovarium* ovoideum, 7 mm. altum, 3·75 mm. diametro, densissime adpresso-hirsutum ; stylus 1·2 cm. longus, glaber.

Azerbaidjan : from the Urmia district, *Gilliat-Smith* No. 2636.

This evidently attractive species is closely related to *A. Fenzlii* Boiss. Diagn. Ser. II. v. 89 (1856), from which it differs in its larger parts and more distantly placed leaflets. The flowers appear to be larger than actual measurements show them to be. *A. Fenzlii* is known only from the Cilician Taurus.

The allied species *A. Barba-Jovis* DC. differs in the indumentum of the leaves. It is known from Armenia and eastern Anatolia.

A. ebenoides *Boiss* Diagn. Ser. I. ii. 70 (1843).

Plain below Mt. Sir, Urmia district, 27.5.28, flowers ruby-red, No. 2282.

Distrib. N. Persia.

A. eriopodus *Boiss.* Diagn. Ser. I. ii. 48 (1843).

Hills south-east of Lake Urmia and north of the town of Marágha, 26.5.26, flowers purple, No. 1606 ; hills to the south of Tabriz, 5.6.27, No. 1897, 14.6.28, No. 2269 ; fruits and seeds, 29.6.28, 49/1928.

Distrib. N. Persia.

The specimens are a little more shaggily hairy than the type specimen of *Aucher-Eloy* 4422 at Kew.

A. (Sect. **Rhacophorus**) **glabristylus** *Turrill* sp. nov. ; ab *A. andalanico* Boiss. et Hausskn. foliolis 5–6-jugis, axillis usque ad 7-floribus, ab *A. eriosphaero* Boiss. et Hausskn. vexillo longiore differt.

Fruticulosus caulibus usque ad 1·8 dm. longis ramis brevibus crassis depressis valde armatis dense foliatis. *Folia* 3–6 cm. longa, foliolis 5–6-jugis planis vel subplanis ellipticis apice acute spinulosis usque ad 1·3 cm. longis 5 mm. latis pagina utraque dense albo-tomentosis, rhachide inferne albo-hirsuta apicem versus glabrescente, stipulis ovatis petiolo adnatis parte libera triangulare vix 2 mm. longa dorso albo-hirsutis deinde plus minusve glabrescentibus. *Flores* in axillis 6–7 dense aggregati, in capitulum subsphaericum circiter 3·5 cm. diametro conferti ; bracteae tenuiter lineares, 8–10 mm. longae, superne albo-villosissimae, inferne leviter pilosae

vel fere glabrae. *Calyx* 1·0 cm. longus, mox usque ad basin fissilis, dense et subpatule villosus usque ad basin. *Vexillum* 2·1 cm. longum, lamina violacea basi triangulari-auriculata ungui subaequilonga ; alae carinaque unguibus vaginae stamineae alte adnatae. *Ovarium* oblongo-cylindricum, 3·5 mm. altum, densissime villosum ; stylus 1·4 cm. longus, glaber.

N. Persia : hills to the south of Tabriz, 5.6.28, *Gilliat-Smith* 2357 (nomenclatural type) ; hills south of Tabriz, 6.29, No. 2548.

The species described above is an addition to a very closely related group placed by Boissier in the section *Rhacophorus*. In addition to the species mentioned in the differential diagnosis our plant is closely related to *A. totschalensis* Bornm., Bull. Herb. Boiss. Ser. II. v. 763 (1905), from which it differs chiefly by the smaller leaves, leaflets, and flowers, and the whiter denser indumentum of the leaves.

A. hololeucus *Boiss. et Buhse* Aufz. 59 (1860).

Above Zindjanab, Sahand Range, flowers pale-blue, 25–27. 6.29, No. 2520.

Distrib. N. Persia.

A. latifolius *Lam.* Dict. i. 319 (1783).

Hills south-east of Lake Urmia, 26.5.26, flowers purple, No. 1581.

Distrib. Armenia, N. Persia.

A. macrocephalus *Willd.* Sp. Pl. iii. 1260 (1803).

Yam, 23.6.29, flowers yellow, handsome, No. 2569.

Distrib. Asia Minor, Armenia.

The calyces are somewhat more finely silky and the flowers slightly smaller than in most specimens at Kew.

A. macrourus *Fisch. et Mey.* in Bull. Soc. Nat. Mosc. 1838, 346.

Mt. Sir, Urmia district, 27.5.28, flowers dirty yellow, No. 2286.

Distrib. N. Persia, Caucasus.

A. Michauxianus *Boiss.* Diagn. Ser. I. ii. 62 (1843).

Mt. Sir, Urmia district, 27.5.28, No. 2280.

Distrib. N. Persia.

A. mishouensis *Turrill* sp. nov. ; ab *A. psiliostylo* Bunge spinis brevioribus stipulis albo-membranaceis angustioribus, foliolis minoribus, petalis filamentorum tubo brevissime adnatis facile distinguitur.

Planta fruticosa, valde spinosa, 1·5 dm. alta, ramis 9 cm. longis vel saepissime brevioribus glabris. *Folia* 2·5–3·5 cm. longa, foliolis 3–4-jugis lineari- vel oblongo-lanceolatis pagina superiore plus minusve concava acuminato-spinescentibus 6–8 mm. longis 1·5 1·75 mm. latis pagina utraque dense adpresse sericeo-pubescentibus, petiolulo 0·5 mm. longo ; rhachis adpresse sericeo-cana ; stipulae a basi ovata lanceolatae, circiter 5 mm. longae albo-membranaceae, margine ciliatae. *Inflorescentia* subcapitulata circiter

6-flora, subdensa ; bracteae lanceolatae vel ovato-lanceolatae, acuminatae, subnaviculares, 0·8–1·0 cm. longae, usque ad 4 mm. latae, albo-ciliatae. *Calyx* albo-hirsutus, pilis longis brevibusque instructus; tubus 8 mm. longus ; dentes subulati, 6 mm. longi, purpurascentes, inferne longe pilosi, apicem versus fere glabri. *Vexillum* 1·8 cm. longum, lamina oblonga basi obtuse auriculato-angulata 1·2 cm. longa ; alae 1·5 cm. longae ; carina 1·4 cm. longa. *Stylus* 7–8 mm. longus, inferne adpresse pubescens, superne glaber. *Legumen* compresso-ellipsoideum, 5–6 mm. altum, dense adpresse pubescens, monospermum.

N. Persia : Tabriz district, summit of Mihsou Dagh, grows in large dense cushions 2–3 m. in diameter, 30.8.28, flowers purple, *Gilliat-Smith* 2484.

The species described above has been difficult to place satisfactorily in any of Boissier's sections of the subseries *Tragacantha*. As Boissier states [Flor. Or. ii. 213 (1872)] he has altered the essential diagnostic characters used by Bunge [Gen. Astrag. (1868)] while retaining his names. It has resulted from this that species placed in different sections by Bunge are brought together by Boissier and the characters stressed by the authors are not exactly the same.

The most important characters of our plant, on the basis of Boissier's classification, are : the fairly large bracts, the absence of bracteoles, the calyx tube hirsute to the base, the claw of the vexillum narrowed to the base (stenonychinum), and the petals very shortly adnate to the base of the filament sheath. In all these characters except the last there is complete agreement with the diagnosis (as modified by Boissier) of the section *Rhacophorus*.

In general appearance *A. mishouensis* resembles *A. aureus* Willd. but this species has a broad claw to the vexillum (platonychinum)—or rather the claw is scarcely distinguishable from the lamina.

A. mollis *M. Bieb.* Flor. Taur.-Cauc. iii 495 (1819).

In garden in hills south of Tabriz, 18.5.28, flowers greenish-yellow. No. 2283.

Distrib. Armenia, Caucasus, N. Persia.

This may represent a new variety of the species since it has leaves much less hirsute than those of other specimens at Kew.

A. odoratus *Lam.* Encycl. i. 311 (1783).

Zindjanab, end of June, 1929, No. 2532.

Distrib. Asia Minor, Armenia, Caucasus, N. Persia.

A. paradoxus *Bunge* Astrag. i. 64 (1868) ; ii. 108 (1869).

Hills south of Tabriz, 14.4.26, flowers silvery-white, issuing from under the sand, No. 1371 ; 10.4.27, No. 1776.

Distrib. Azerbaidjan, Armenia.

A. (Sect. **Aulacolobus**) **phaulanthus** *Turrill* sp. nov. ; ab *A. striatello* Pall. floribus multo minoribus, calyce haud vel vix nigro-hirtis dentibus haud lanceolatis distinguitur.

Herba annua, parcissime hispida, caulibus suberectis vel decumbentibus 1·5 dm. longis. *Folia* 4–6 cm. longa, imparipinnata, foliolis 6–8-jugis elliptico-oblongis apice retusis basi cuneatis 6–7 mm. longis 3 mm. latis petiolulis 0·5 mm. longis suffultis ; stipulae, ovato-triangulares, acuminatae, 3–5 mm. longae, membranaceae, cilatae. *Racemus* 2–3-florus, pedunculo rhachideque 3–4 cm. longo gracile foliis breviore vel aequilongo ; bracteae triangulare-lanceolatae, acuminatae, 3 mm. longae, membranaceae ; flores 5–6 mm. longi. *Calyx* 3·5 mm. longus, pilis albis nonnullis nigris adpressis instructus, dentibus aciculare-subulatis usque ad 2 mm. longis (in fructu leviter augmentis). *Petala* conspicue longitudinaliter violacea, purpureo-striata. *Legumen* arcuatum, acutum, 2 cm. longum, 5 mm. latum, glaberrimum, sutura ventrali carinata, dorsali bicarinata.

N. Persia : Tabriz, garden weed, 12.6.28, *Gilliat-Smith* 2271.

The section *Aulacolobus* in which our plant is to be placed, was formed by Bunge [Gen. Astrag. 18 (1868)] for three species : *A. aulacolobus* Boiss., *A. striatellus* M. Bieb., and *A. pictus* Boiss. The last was reduced by Boissier [Flor. Or. ii. 237 (1872)] to *A. conduplicatus* Boiss. From all three species *A. phaulanthus* is distinguished by its much smaller flowers. Tabriz is also considerably to the east or south of the distributional areas of the hitherto known species of this section of the genus.

A. platyraphis *Fisch.* ex Bunge Astrag. i. 37 (1868) ; ii. 48 (1869).
Near Tabriz, 4.26, flowers greenish-yellow, purple tipped, No. 1440 ; hills south of Tabriz, 4.5.29, No. 2499.
Distrib. Syria, Cappadocia, Iraq.

A. podocarpus *C. A. Mey.* Verz. Pfl. Cauc. 142 (1831).
Yam, 6.28, No. 2411.
Distrib. Armenia, N. Persia.

A. punctatus *Bunge* Astrag. i. 120 (1868), ii. 209 (1869).
Hills north of Tabriz, 15.5.28, flowers purple, No. 2291.
Distrib. Azerbaidjan.
The pedicels are slightly longer than in the type sheet at Kew.

A. robustus *Bunge* Astrag. i. 122 (1868) ; ii. 212 (1869).
Urmia district, 5.26, Nos. 1522, 1604.
Distrib. Azerbaidjan.
The identification, owing to the incomplete material available, is given with some hesitation. No. 1522 is in flower and has densely hairy ovaries ; No. 1604 has quite ripe glabrous or almost glabrous fruits.

A. Rollovii *Grossheim* in Beih. Bot. Centrlbl. xliv. 2. 223 (1927).
Hills south of Tabriz, 5.5.26, flowers purple and dull yellow, No. 1479 ; 12.5.27, No. 1902 ; 6.28, No. 2272 ; 1.6.28, No. 2288.
Endemic near Tabriz.

A. (Sect. **Hymenostegis**) **sirensis** *Turrill* sp. nov.; ab *A. uraniolimneo* Boiss. foliolis obovato-ellipticis, capitulis longe pedunculatis (e descriptione) distinguitur.

Planta suffruticosa, caespitoso-erinacea, caulibus 1·0–1·2 dm. altis in parte inferiore spinis tenuibus recurvo-patentibus vel valde recurvis dense instructis. *Folia* 2 cm. longa, densissime albo-hirsuta, foliolis circiter 4-jugis obovato-ellipticis mucronatis 3–5 mm. longis 2–2·5 mm. latis; stipulae lanceolatae, 1·3 cm. longae, hyalinae, glabrae, margine longe ciliata excepta, longitudinaliter striato-nervosae, petiolo adnatae, parte libera 6–7 mm. longa. *Capitula* densa, circiter 12–15-flora, sphareoidea, 2–2·5 cm. diametro, pedunculo 3–5·5 cm. longo patule villosulo suffulta e caespite valde exserta; bracteae oblongae, acuminatae, 7–9 mm. longae, 3–3·5 mm. latae, glabrae sed margine ciliata apicem versus longe piloso-plumosae. *Calyx* 1·5 cm. longus, longe albo-pilosus, dentibus 5 mm. longis aciculari-subulatis. *Corolla* purpurea; vexillum 1·7 cm. longum, lamina oblonga 1 cm. longa apice truncata vel leviter retusa basi obtuse auriculata; alae 1·5 cm. longae, unguibus 8 mm. longis, basi filamentorum vaginae brevissime adnatis; carina 1·2 cm. longa. *Ovarium* cylindricum, densissime villosum, 4 mm. longum, circiter 9-ovulatum; stylus 8 mm. longus, compressus, stigmate minute ovoideo-globulare.

N. Persia: Mt. Sir, Urmia district, 27.5.29, *Gilliat-Smith* 2281.

The species here described forms a pretty plant with its white hairy leaves and peduncled heads of purple flowers. That it is correctly placed in the section *Hymenostegis* cannot be doubted, but in the absence of specimens of several species of the section its exact relationships are not so certain. The descriptions of *Astragalus paralurges* Bunge Gen. Astrag. 111 (1868) and Boiss. Flor. Or. ii. 379 (1872) agree in many important points with that here published but the vexillum of this species is said to be somewhat acute and the capitula lax. On the whole the closest agreement has been found with the description of *A. uraniolimneus* Boiss. (l.c. 380), a species from Russian Armenia "monte Alages et ad lacum Gocktschai (Scidl)." The much shorter peduncles, of equal length with the capitula, the different shaped leaflets, and obtuse bracts serve to distinguish Boissier's species from ours.

A. stenostachys *Beck* in Denkschr. Math.-Naturw. Cl. K. Akad. Wiss. li. 333 (1886).

Near Tabriz, 18.5.28, flowers purple, No. 2284.
Distrib. N. Persia.

A. tabrisianus *Buhse* e Fischer in Bull. Soc. Imp. Nat. Mosc. xxvi. 445 (1853); Boiss. et Buhse Aufz. 65 (1860).

Tabriz, hills to the south, 29.6.26, flowers purple, No. 1744; 6-7.27, No. 1907; Yam, 6.28, No. 2410.
Distrib. N. Persia.

The plants enumerated above have been identified solely by comparison with the descriptions quoted, there being no specimens so

named at Kew. " Hills to the south of Tabriz " indicate the northern prolongations of the Sahand range, whence Buhse obtained his original material. Fischer apparently is responsible for adding the material " ad Dshehan nameh B. Bode " to the species and so enlarging the original description. His comments show that he accepted a certain polymorphism within the species, for he says " Differentiae quas reperi non sufficiunt ad constituendum species separatas " and lists the differences shown by Buhse's plant presumably from the material above quoted. In the description the peduncles are said to be " breves aut parum longiores " and to be from " 1 ad 3½ pollices longi." In our material, No. 1744 has peduncles 1–1·5 cm. long, in No. 1907 they are 0·5–2 cm. long, and in No. 2410 up to 10 cm. long. Other small differences variously combined and of varying degrees can also be noted in the specimens but there seems no sufficient reason with the material available for making more than one species.

A. teheranicus *Boiss. et Hohen.* in Boiss. Diagn. Ser. I. ix. 44 (1849).

Hills south of Tabriz, 5.5.26, flowers vary from pink to ruby-red and purple, No. 1480; 6.7.26, No. 1669; 29.6.26, No. 1742; 12.5.27, Nos. 1899, 1900.

Distrib. N. Persia.

A. tribuloides *Del.* Flor. Aegypt. Illustr. 70 (title-page 1812); Boiss. Flor. Or. ii. 224 (1872).

Hills south of Tabriz, 5.6.29, flowers minute white or mauve, No. 2500.

Distrib. Canaries, N. Afr., Egypt, Syria, Palestine east to N.W. India.

A. variistipula *Turrill* in Kew. Bull. 1929, 227.

Plains south of Tabriz, 5.27 (flowers pink or purple), 6.27 (fruits), No. 1901; hills south of Tabriz, 12.6.28, No. 2274.

Endemic.

A. xylobasis *Freyn* in Bull. Herb. Boiss. vi. 984 (1898). *A. xylorrhizus* Freyn et Sint. in Oesterr. Bot. Zeitschr. xlii. 46 (189) non Bunge.

Mt. Sir, Urmia district, 27.5.28, flowers purple, No. 2287.

Distrib. Paphlagonia, Armenia.

The specimens approach the var. *angustus* Freyn et Sint. in Oesterr. Bot. Zeitschr. xliv. 28 (1894).

Cicer arietinum *L.* Sp. Pl. 738 (1753).

Yam, 8.27, flowers white or pink, No. 1973.

Distrib. Cultivated throughout the Medit. Region and frequently occurring as an escape.

Coronilla varia *L.* Sp. Pl. 743 (1753).

Hills north of Tabriz, 25.6.26, flowers white, pink, or red with black-edged keel, No. 1716.

Distrib. Cent. Eur. and Medit. Region.

Glycyrrhiza glabra *L.* Sp. Pl. 742 (1753).
Near Tabriz (in fruit), 17.7.27, No. 1984 ; garden south-east of Tabriz, 12.6.28, No. 2270.
Distrib. Medit. Region and Cent. Asia.

Lathyrus Cicera *L.* Sp. Pl. 730 (1753).
In gardens south-east of Tabriz, 29.4 26, No. 1437.
Distrib. Cent. Eur. and Medit. Region.

Lotus corniculatus *L.* Sp. Pl. 775 (1753).
Stream under Mishou Dagh, 8.29, No. 2610.
Distrib. E.N. Temp. Region and now widely introduced into other areas.

Medicago lupulina *L.* Sp. Pl. 779 (1753).
In garden, near Tabriz, 6.7.26, No. 1657.
Distrib. E.N. Temp. Region.

Melilotus officinalis *Lam.* Flor. Fr. ii. 594 (1778).
Garden weed, near Tabriz, 5.26, No. 1620.
Distrib. E.N. Temp. Region.

Onobrychis Buhseana *Bunge* ex Boiss. Flor. Or. ii. 541 (1872).
Near Tabriz, in flower and fruit, 6.7.26, flowers cream-coloured or pink with delicate veins, No. 1668 ; 29.6.26, No. 1730 ; 6.27 (very young and not yet in flower), No. 1895 ; hills to the south of Tabriz, 5.7.27, No. 1898.
Distrib. Tabriz district only.
The interesting series of specimens enumerated vary somewhat in the colour and size of the flowers. Širjaev [Publ. Fac. Sci. Univ. Masaryk 76, 37 (1926)] has already noticed a range in flower size. The identification has been made from description only since Buhse's specimens have not been available for comparison.

O. cornuta *Desv.* Journ. Bot. iii. 81 (1814).
Urmia district, 20.5.26, flowers very showy, pink of various shades, No. 1525 ; hills north of Tabriz, 15.5.27, No. 1779 ; Sir, Urmia district, 27.5.28, No. 2279. Grows in large dense cushions, 2–3 m. in diameter.
Distrib. Asia Minor to Syria, Caucasus, and Baluchistan.

O. subacaulis *Boiss.* Flor. Or. ii. 544 (1872) ?
Near Khoi, 21.5.28, flowers pink or red, No. 2285.
Distrib. Azerbaidjan.
Fruit is needed to confirm the identification.

O. viciaefolia *Scop.* Flor. Carniol. ed. 2, ii. 76 (1727), var. **persica** *Širjaev* Publ. Fac. Sci. Univ. Masaryk 56, 181 (1925).
Urmia district, 5.26, flowers pink, No. 1523. Also cultivated at Kew as K. 427 from seed sent from near Tabriz.
Distrib. (of species) Eur., Orient.
(of var.) Persia.

Ononis leiosperma *Boiss.* Flor. Or. ii. 57 (1872).
Yam, 8.28, No. 2486. Common, flowers pink, July to September.
Distrib. Syria, Persia.

Sophora alopecuroides *L.* Sp. Pl. 373 (1753).
Urmia district, 5.26, flowers dirty, creamy white in dense thick spikes, No. 1518; near Tabriz, 25.6.26, No. 1714; near Tabriz, 6.27, No. 1904.
Distrib. E. Balk. Penins., Asia Minor eastwards to Persia, Afghanistan, Turkestan, and Cent. Asia.

Trifolium hybridum *L.* Sp. Pl. 766 (1753).
Near Tabriz, 8.27, No. 1974.
Distrib. Cent. Eur. and Medit. Region.

T. pratense *L.* Sp. Pl. 768 (1753).
Weed in garden, near Tabriz, 6.7.26, flowers pink-purple, No. 1663.
Distrib. E.N. Temp. Region.

T. repens *L.* Sp. Pl. 767 (1753).
Weed in garden, near Tabriz, 6.7.26, No. 1662.
Distrib. N. Temp. Region.

Trigonella arcuata *C. A. Mey.* Verz. Pfl. Cauc. 136 (1831). (*T. cancellata* Desv. var. *arcuata* Širjaev ms. 1929).
Hills to the south of Tabriz, 5.27, flowers yellow, No. 1906a.
Distrib. Armenia, N. Persia.

T. Noeana *Boiss.* Diagn. Ser. II. ii. 11 (1856) forma **integrata** Širjaev (ms. 1929).
Near Tabriz, 5.26, flowers yellow, No. 1646; 6.7.26, No. 1670; hills to the South of Tabriz, 5.27, No. 1906b; Tabriz, garden weed, 6.28, Nos. 2295, 2296; cultivated at Kew from Tabriz seed, 14.8.28.
Distrib. Cappadocia, Armenia, Iraq, N. Persia.

Vicia Ervilia *Willd.* Sp. Pl. iii. 1103 (1803).
Near Tabriz, 6.27, No. 1893; 8.27 (in fruit), No. 2128.
Distrib. Cent. Eur. and Medit. Region.

V. hyrcanica *Fisch. et Mey.* Ind. Sem. Hort. Petrop. ii. 53 (1836).
Near Tabriz, 5.26, flowers purple, No. 1644.
Distrib. Transcaucasia, Armenia to Persia and Afghanistan.

V. persica *Boiss.* Diagn. Ser. I. ii. 103 (1843) var. **stenophylla** *Boiss.* Flor. Or. ii. 583 (1872).
Above Zindjanab, Sahand Range, 25-27.6.29, flowers very showy, mauve to purple, No. 2517.
Distrib. (of species and var.) Armenia, N. Persia.

V. tenuifolia *Roth* Tent. Flor. Germ. i. 309 (1788), verging towards the var. **stenophylla** *Boiss.* Flor. Or. ii. 586 (1872).

Between Yam and Shor Dara (Dere), 24.6.28, flowers pink, No. 2408. Flowers in June and part of July.

Distrib. (of species) E.N. Temp. Region.

ROSACEAE.

Alchemilla acutiloba *Stev.* in Bull. Soc. Imp. Nat. Mosc. xxix. 173 (1856).

Yam, 21.8.27, flowers greenish yellow, No. 2087 ; under Mishou Dagh, 9.9.28, No. 2482 ; brook under Mishou Dagh, 5.8.29, No. 2584.

Distrib. Balkan Peninsula, Asia Minor, Caucasus, Iraq, N. Persia.

Amygdalus communis *L.* Sp. Pl. 473 (1753).

Near Tabriz, 4.26, No. 1393.

Distrib. Syria, east to N. Persia, and introduced into many countries.

Cotoneaster nummularia *Fisch. et Mey.* Ind. Sem. Hort. Petrop. ii. 34 (1836).

Mishou Dagh, also Dik Dash at Yam, 8.28 (in fruit), No. 2472.

Distrib. E. Asia Minor, Syria, Iraq, Armenia, Persia, Caucasus, N. Africa, N.E. India, Cent. Asia.

Potentilla hirta *L.* Sp. Pl. 497 (1753) var. **pedata** *Koch* Syn. ed. 2, 237 (1843).

Mishou Dagh and Dik Dash, 8.9.29, flowers yellow, No. 2624.

Distrib. (of species and var.) Eur. and Medit Region.

P. reptans *L.* Sp. Pl. 499 (1753).

Sahand and Yam, 5.6.29, flowers yellow, No. 2551.

Distrib. E.N. Temp. Region.

Prunus Armeniaca *L.* Sp. Pl. 474 (1753). *Armeniaca vulgaris* Lam.

Near Tabriz, 4.26, No. 1392.

Distrib. Caucasus, Transcaucasus.

P. divaricata *Ledeb.* Ind. Hort. Dorp. Suppl. 6 (1824) ; Boiss. Flor. Or. ii. 651 (1872).

Near Tabriz, 25.4.26, Nos. 1391, 1399. Turki " eltche," Persian " alutche."

Distrib. Balkan Peninsula east to N. Persia.

P. incana *Stev.* in Mem. Soc. Nat. Mosc. iii. 263 (1812). *Cerasus incana* Boiss. Flor. Or. ii. 647 (1872).

Hills north of Tabriz, 24.4.29, No. 2556.

Distrib. Asia Minor, Iraq, Armenia, Caucasus, N. Persia. Cent. Asia.

Prunus sp.
Near Tabriz, 25.4.26, No. 1400.
A flowering branch only, with hairy pedicels and sepals.

Poterium Sanguisorba *L.* Sp. Pl. 994 (1753).
Near Tabriz, 5.26, No. 1528 ; Yam, 22.5.27, No. 2071.
Distrib. Eur., Medit. Region, Cent. Asia.

Rosa canina *L.* Sp. Pl. 491 (1753) sensu Boiss. Flor. Or. ii. 685 (1872).
Wild garden in hills south of Tabriz, 5.29, No. 2563.
Distrib. Eur., Medit. Region, N. Asia.

R. canina *L.* var. **collina** *Boiss.* l.c.
Dik Dash, Yam, 21.8.27, No. 2093.
Distrib. Eur., Medit. Region, Cent. Asia.

R. foetida *Herrmann* Dissert. Rosa 18 (1762).
Urmia, 5.26, flowers yellow, No. 1570.
Distrib. Asia Minor, Syria, Armenia, Persia, Afghanistan.

R. foetida *Herrmann* var. **bicolor** *Willmott.* The Genus Rosa ii. 269 (1911).
West of Urmia, 5.26, flowers yellow and copper coloured, No. 1574.
Distrib. Here and there with the type variety.

R. glutinosa *S. et S.* Prodr. Flor. Gr. i. 348 (1806) ; Flor. Gr. t. 482 (1825) ; sensu Boiss. Flor. Or. ii. 679 (1872).
Mishou Dagh, in fruit, 7.8.25, No. 2003 (fruit subglobular, hispid, appears to be fairly typical) ; Mishou Dagh, in fruit, 30.8.28, No. 2485 (fruit elongated, glabrous) ; below Zindjanab, in flower only, 25-27.6.29, No. 2639 (young receptacles pubescent but not hispid, leaflets larger than usual ; in the absence of fruits the identification is very tentative).
Distrib. (of species s. l.) Crete, Greece, Epirus, Albania, Macedonia, Dalmatia, Asia Minor, Syria, Armenia, N. Persia, Transcaspia.
The difficulties surrounding *R. glutinosa* S. et S. have been often commented upon by rhodologists who have been very evidently in disagreement with regard to its limitation and subdivision. Reference may be made to Christ in Boissier Flor. Or. Suppl. 222 (1888) ; Crépin in Bull. Soc. Bot. Belg. xxxi. ii. 49 seq. (1892) ; and Rolfe in Kew Bull. 1918, 153.

Saxifragaceae.

Parnassia palustris *L.* Sp. Pl. 273 (1753).
Yam, under Mishou Dagh, very plentiful in wet grass fields, 21.8.27, No. 2078. Flowers in latter half of August and Sept., always in the mountains.
Distrib. N. Temp. Region.

Ribes aureum *Pursh.* Flor. Amer. Septentr. 164 (1814).
Tabriz, cult. in garden, 4.26, No. 1385 ; 26.4.26, No. 1415.
Distrib. N. Amer.

CRASSULACEAE.

Cotyledon libanotica *Labill.* Ic. Pl. Syr. Dec. iii. 3, t. 1 (1809) var. **glaber** Boiss. (sub *Umbilico*, Flor. Or. ii. 772 : 1872).
Mishou Dagh, 19.7.28, flowers white, No. 2438 ; 5.8.29, No. 2592.
Distrib. (of species) Syria, Palestine, Kurdistan, E. Asia Minor, N. Persia.
(of var.) Syria, E. Asia Minor, N. Persia.

Sedum album *L.* Sp. Pl. 432 (1753).
Mishou Dagh, half-way up the mountain, in cracks in rocks, white flowers, 19.7.28, No. 2361.
Distrib. E.N. Temp. Region.

S. sempervivoides *Fisch.* ex M. Bieb. Flor. Taur.-Cauc. iii. 313 (1819).
Near Tabriz, 21.8.27, No. 2116 ; high up on Mishou Dagh, whole plant deep red, 19.7.28, No. 2360.
Distrib. Asia Minor, Armenia, Transcaucasia.

LYTHRACEAE.

Lythrum Salicaria *L.* Sp. Pl. 446 (1753) var. **tomentosum** *Boiss.* Flor. Or. ii. 732 (1872).
Yam, marshy fields, 8.27, No. 1971.
Distrib. (of species) now almost cosmopolitan.
(of var.) especially from the Balkan Peninsula eastwards to N. Persia and Afghanistan.

ONAGRACEAE.

Epilobium Dodonaei *Vill.* Hist. Pl. Dauph. 507 (1789).
Stony plain, Shor Dara (Dere), near Yam, 24.6.28, flowers large pink, No. 2338 ; rocky stony places, 7.28, No. 2392.
Distrib. Cent. and S. Eur. east to Armenia, Caucasus, and N. Persia.

E. hirsutum *L.* Sp. Pl. 347 (1753) var. **tomentosum** *Boiss.* Flor. Or. ii. 746 (1872).
Yam, 8.27, flowers deep pink, No. 1970 ; cultivated at Kew from Yam seeds, 1929.
Distrib. (of species) E.N. Temp. Region, Africa.
(of var.) here and there with the species and especially common in the Medit. Region.

E. nervosum *Boiss. et Buhse* Aufz. 88 (1860).
Mishou Dagh, rocks and crags, 2.9.29, flowers pink, No. 2634.
Distrib. Russia, Asia Minor east to Persia and Cent. Asia.

Mesembryanthemum polyanthon *Haw.* Syn. Pl. Succ. 270 (1812).

Cultivated in pots, Tabriz, 5-6.29, flowers bright pink-purple, No. 2574.

Distrib. S. Africa.

UMBELLIFERAE.

Anethum graveolens *L.* Sp. Pl. 263 (1753), var. **submarginatum** *Lej. et Court.* ex Thellung in Hegi Flor. von Mittel-Europa V. 2. 1293. (1925).

Cultivated at Tabriz, in a garden as a pot-herb, 7.26, flowers yellow, No. 1769 ; 7.27, No. 1983 ; 7.28, No. 2417 ; cultivated at Kew from Tabriz seeds, 14.8.28. In Persian " Shuvit."

Distrib. Widely cultivated, especially in the Orient.

Anthriscus nemorosa *Spreng.* Umb. Prod. 27 (1813).

Zindjanab, 25-27.6.29, No. 2640.

Distrib. Cent. and S. Eur. east to Caucasus and N. Persia, and Cent. Asia.

Astrodaucus orientalis *Drude* in Engl. und Prantl Pflanzenfam. iii. 8, 157 (1897). *Daucus pulcherrimus* Koch ex DC. Prodr. iv. 210 (1830).

Near Tabriz, 9.25, flowers white, inflorescence handsome, No. 1285 ; 5-6.26, No. 1641 ; 6.7.26, No. 1653 ; 26.5.27, No. 2106.

Distrib. S. Russia, E. Asia Minor, Armenia, Syria, Persia.

Bupleurum exaltatum *M. Bieb.* Tabl. Prov. Casp. 113 (1798) sec. Wolff in Engler, Pflanzenr. iv. 228, 134 (1910) var. **linearifolium** *Boiss.* in Ann. Sci. Nat. 150 (1844).

Dik Dash, Yam, 21.8.27, flowers yellow, No. 2105.

Distrib. (of species) Cent. and S. Eur. east to Afghanistan and Cent. Asia.

(of var.) Asia Minor, Syria, Iraq, N. Persia, Afghanistan, Turkestan.

B. rotundifolium *L.* Sp. Pl. 236 (1753).

Near Tabriz, 21.7.26, No. 1767 ; cultivated at Kew from Tabriz seed as K.418. Flowers from the end of May.

Distrib. Cent. and S.E. Eur. eastwards to Transcaucasia and N. Persia.

Carum cylindricum *Boiss. et Hohen.* Diagn. Ser. I. x. 23 (1849).

Near Tabriz, garden weed, 5.26, flowers white, No. 1481 ; 6.7.26, No. 1655 ; 1.5.27, Nos. 1888, 1889.

Distrib. Transcaucasia, Persia, Baluchistan.

Caucalis daucoides *L.* Sp. Pl. 241 (1753).

Hills south of Tabriz, 5.6.27, flowers pink-white, No. 1887, Yam, in a ploughed field, 21.8.27, No. 2090.

Distrib. Cent. Eur. and Medit. Region.

Chaerophyllum macrospermum *Fisch. et Mey.* ex Hohen. in Bull. Soc. Nat. Mosc. 327 (1838).

Mishou Dagh, end of August 1929, Nos. 2616, 2627 ; 5.8.29, No. 2600 (variety or form with longer styles).

Distrib. Armenia, N. Persia.

Coriandrum sativum *L.* Sp. Pl. 256 (1753).

Near Tabriz, 21.7.26, flowers white, No. 1768 ; 7.27, No. 1978. Turki " Gashnish." Persian " Kashniz." The plant is used in salads.

Distrib. Medit. Region, Africa.

Cuminum Cyminum *L.* Sp. Pl. 254 (1753).

Cultivated at Tabriz from seeds obtained from a bazaar, flowers 5.28, fruits 6.28, No. 2304. Turki " Göi-zira "=green weed. The plant is used as a pot-herb.

Distrib. Widely cultivated in the East.

Daucus Carota *L.* Sp. Pl. 242 (1753) s.l.

Tabriz, cultivated, 7.27, No. 1981 ; in gardens east of Tabriz, 7.27, No. 2151 ; near Tabriz, 7.27, No. 1982.

Distrib. E.N. Temp. Region.

Echinophora trichophylla *Smith* in Rees Cycl. xii. (1819).

Near Tabriz, 27.6.27, No. 1976 ; 6.27, No. 2043. Flowers white, whole plant aromatic.

Distrib. Armenia, Azerbaidjan.

Eryngium caeruleum *M. Bieb.* Flor. Taur.-Cauc. i. 200 (1808).

Yam, 7.8.27, No. 2012. The whole plant varies in colour from grey to pale or dark blue.

Distrib. Transcaucasus, N. Persia, Khorassan, Turkestan, Afghanistan.

Falcaria vulgaris *Bernh.* Syst. Verz. Erf. 176 (1800).
F. Rivinii Host Flor. Austr. i. 381 (1827).

Yam, 8.27, flowers white, No. 1980 ; 21.8.27, No. 2107.

Distrib. Cent. Eur., Medit. Region, Cent. Asia.

Ferula ovina *Boiss.* Flor. Or. ii. 986 (1872).

West of Lake Urmia, flowers yellow, 5.26, No. 1610.

Distrib. Persia, Baluchistan.

Foeniculum vulgare *Mill.* Gard. Dict. ed. viii (1768). subsp. **capillaceum** *Holmboe* var. **dulce** *Thellung* in Hegi Illustr. Flor. von Mittel-Europa V. 2. 1287 (1925). *F. dulce* Mill. l.c.

Cultivated in garden at Tabriz as a pot-herb, 7.28, flowers yellow, No. 2416 Turki " Raziane," also known locally as " Dadli boyana." No. 1770, near Tabriz, 7.26, may belong to the same variety but the specimen is too young to determine with certainty.

Distrib (of species) perhaps wild in Cent. and W. Eur. and Medit. Region.

(of var.) widely cultivated, especially in the Medit. Region.

Hippomarathrum crispum *Koch* in Nov. Act. Nat. Cur. xii. 136 (1824) var. **longilobum** *Boiss.* Flor. Or. ii. 932 (1872).
Yam, stony hills around Dik Dash, 28.8.27, No. 2088.
Distrib. (of species) Caucasus, Armenia, N. Persia.
(of var.) Azerbaidjan, Seidkhodji.

Lisaea heterocarpa *Boiss.* Flor. Or. ii. 1088 (1872).
Near Tabriz, cornfield weed 6.7.27, No. 1649 ; 7.27, No. 1886. Flowers May and July.
Distrib. Iraq, N. and Cent. Persia.

Malabaila Aucheri *Boiss.* in Ann. Sci. Nat. Ser. 3. i. 336 (1844).
Near Tabriz, 22.6.27, No. 1977 ; in gardens south-east of Tabriz, flowers yellow, 5.28, fruit 6.28, No. 2303 ; above Zindjanab, Sahand Range, 25-27.6.29, No. 2506.
Distrib. Iraq, N. and Cent. Persia.

Pimpinella Anisum *L.* Sp. Pl. 264 (1753).
Cultivated at Tabriz in a garden as a pot-herb, 7.28, flowers white, No. 2415. Locally known as " Antchibun," i.e. a corruption of Anisum.
Distrib. Exact place of origin unknown, now widely cultivated.

P. Tragium *Vill.* Prosp. 24 (1779) ; Hist. Pl. Dauph. ii. 605 (1787).
Yam. 12.7.28, flowers white, No. 2414.
Distrib. Cent. Eur. and Medit. Region.

Prangos uloptera *DC.* Prodr. iv. 239 (1830).
Mishou Dagh, 12.7.28, No. 2418 ; near Tabriz, 7.29, No. 2571. The young shoots are pickled and called in Turki " Tchaschir."
Distrib. Iraq, Persia, Armenia.

Reutera aurea *Boiss.* Flor. Or. ii. 863 (1872).
Near Tabriz, 26.6.27, flowers golden yellow, No. 1975 ; also, probably, hills south of Tabriz, 27.6.28, No. 2413, but specimen very young.
Distrib. Armenia, N., Cent., and E. Persia.

Scandix iberica *M. Bieb.* Flor. Taur.-Cauc. i. 425 (1808) ; iii. 236 (1819).
Near Tabriz, garden weed, 26.4.26, flowers white, No. 1424 ; 5.26, No. 1482 ; 6.7.26, No. 1654 ; 25.4.27, No. 1885.
Distrib. Asia Minor, Syria, east to Armenia and N. Persia.

S. pinnatifida *Vent.* Hort. Cels. t. 14 (1800).
Hills south of Tabriz, 29.4.26, flowers white, No. 1432 ; near Tabriz, 5.26, No. 1612 ; 1.5.27, No. 1884.
Distrib. Medit. Region, east to Armenia and Persia.

Trachyspermum Ammi *Sprague* ex Turrill in Kew Bull. 1929, 228.
Tabriz, weed in garden, 7.8.27, No. 2104.
Distrib. Occurs as a weed and casual in the Medit. Region.

Turgenia latifolia *Hoffm.* Gen. Umbell. 59 (1814).
Near Tabriz, 22.5.27, flowers white or pink, No. 1650 ; 8.27, No. 1979 ; Yam, in a ploughed field, 21.8.27, No. 2089.
Distrib. E.N. Temp. Region.

Zozimia absinthifolia *DC.* Prodr. iv. 195 (1830).
Above Zindjanab, Sahand Range, 25-27.6.29, No. 2513 ; hills south of Tabriz, 7.29, No. 2530.
Distrib. Asia Minor, Cyprus, Syria, Arabia, Caucasus, Iraq, Persia, Turkestan, Baluchistan, Afghanistan.

Umbellifer.
Hills south of Tabriz, 5.29, flowers yellow, No. 2562. Material too incomplete for determination.

CAPRIFOLIACEAE.

Lonicera etrusca *Santi* Viagg. Mont. i. 113, t. 1 (1795).
Cult. in garden, near Tabriz, 6.7.26, No. 1684.
Distrib. Medit. Basin.

RUBIACEAE.

Asperula arvensis *L.* Sp. Pl. 103 (1753).
Near Tabriz, 5.26, No. 1613 ; blue flowers, 6.7.26, No. 1679 ; white flowers, 6.7.26, No. 1680 ; cultivated at Kew from Tabriz seed as K. 450.
Distrib. Eur., Medit. Region.

A. bracteata *Grossh.* in Bieh. Bot. Centrlbl. xliv. 239 (1927).
Hills to the north of Tabriz, 15.5.27, flowers yellow, No. 2039.
Distrib. Persia.

A. glomerata *Griseb.* Spic. Flor. Rumel. et Bithyn. ii. 166 (1844).
Near Tabriz, 6.28, No. 2451 (corollas slightly hispidulous) ; above Zindjanab, Sahand Range, 25-27.6.29, No. 2501 (corollas pubescent). Whole inflorescence a nondescript brownish-green.
Distrib. Asia Minor east to Afghanistan.

A. trichodes *Gay* in DC. Prodr. iv. 582 (1830).
Hills to the south of Tabriz, 4.6.27, flowers whitish pink, No. 1803 ; near Tabriz, 6.27, No. 1840.
Distrib. Armenia, Persia.

A. humifusa *Bess.* Cat. Hort. Crem. Suppl. iii. 4 (1811), sec. M. Bieb. Flor. Taur.-Cauc. iii. 105 (1819).
Red hills to the north of Tabriz, 25.6.26, flowers white, No. 1719 ; Yam. 8.27, No. 2025 ; Yam, 21.8.27, No. 2025 ; Yam, 8.27, No. 2113 ; stream under Mishou Dagh, 8.29, No. 2613.
Distrib. S.E. Eur., Orient.

Callipeltis Cucullaria *DC.* Prodr. iv. 613 (1830).
Near Tabriz, 5.6.27, No. 1799. Flowers greenish-yellow, May and June.
Distrib. Medit. Region.

Crucianella chlorostachys *Fisch. et Mey.* Ind. Sem. Hort. Petrop. i. 25 (1835).

Yam. 8.28, flowers greenish-white, No. 2439.

Distrib. Caucasus, N. Persia.

C. exasperata *Fisch. et Mey.* Ind. Sem. Hort. Petrop. iv. 8 (1838). *C. hispidula* Fisch. et Mey. Ind. Sem. Hort. Petrop. i. 25 (1835) non Decaisne.

Hills to the south of Tabriz, 5.6.27, flowers greenish-white, No. 1802.

Distrib. E. Asia Minor to N. Persia and a var. (?) in Syria.

C. gilanica *Trin.* in Mem. Acad. Petersb. vi. 493 (1818). See E. Malinowski in Bull. Soc. Bot. Genève 2 sér. ii. 16 (1910).

Hills south of Tabriz, 5.6.27, flowers greenish, No. 1839; hills south of Tabriz, 6.28, No. 2277 (var. vel forma floribus roseis); hills south of Tabriz, 6.28, No. 2278; Yam, 25.7.29, No. 2580.

Distrib. Armenia, Iraq, N.W. Persia.

Galium coronatum *S. et S.* Prodr. i. 90 (1806) et Flor. Graec. t. 125 (1813). *G. humifusum* Stapf in Denk. Math.-Naturw, Cl. K. Akad. Wiss. 1. 107 (1885) non M.B.

Urmia district, 5.26, No. 1536; Sir, 27.5.28, No. 2332; near Tabriz, 5.28, No. 2449.

Distrib. S. Balkan Peninsula east to N. Persia.

It is evident that this is a very polymorphic species if accepted in the sense of Boissier [Flor. Or. iii. 80 (1875)]. Moreover, on sheet No. 1536 there are two specimens, one with stem and leaves glabrous or nearly so and the other densely pubescent in all its parts.

G. leiophyllum *Boiss.* Diagn. Ser. I. iii. 36 (1843).

Above Zindjanab, Sahand Range, 25-27.6.29, No. 2526; Mishou Dagh, 5.8.29, No. 2599; Dik Dash, 8.29, No. 2647.

Distrib. Armenia, Kurdistan, N. Persia.

G. nigricans *Boiss.* Diagn. Ser. I. iii. 48 (1843).

Hills to the south of Tabriz, 5.6.27, flowers russet-brown, No. 1804; near Tabriz, 6.28, No. 2450.

Distrib. Syria, Iraq, N. Persia.

G. spurium *L.* Sp. Pl. 106 (1753) var. **echinospermum** *Desp.* Flor. Sarthe 118 (1838). *G. spurium* L. var. *Vaillantii* G. et G. Flor. Fr. ii. 44 (1850).

Tabriz, garden weed, 4.5.27, flowers cream to greenish-yellow, Nos. 2040, 2040a; cultivated at Kew from Tabriz seed as K. 667, 10.7.28.

Distrib. (of species) E.N. Temp. Region.
(of var.) here and there in the species area.

G. tricorne *Stokes* in With. Arr. Brit. Pl. ed. 2. i. 153 (1787).

Near Tabriz, in garden, 24.4.27, flowers white, No. 2041.

Distrib. Eur. and Medit. Region.

G. verum *L.* Sp. Pl. 107 (1753).

Yam, 8.27, flowers yellow, No. 2026; under Mishou Dagh, 10.9.28, No. 2469; brook under Mishou Dagh, 5.8.29, No. 2585.

Distrib. E.N. Temp. Region.

Rubia tinctorum *L.* Sp. Pl. 109 (1753).

Under the red hills north of Tabriz, 25.6.26, flowers yellow, No. 1717.

Distrib. Medit. Region.

VALERIANACEAE.

Valeriana officinalis *L.* Sp. Pl. 31 (1753) ?

Mishou Dagh, 19.7.28, flowers white, No. 2391.

Distrib. E. N. Temp. Region.

The material is insufficient to make the identification certain.

Valerianella diodon *Boiss.* Diagn. Ser. I. iii. 57 (1843) ?

Near Tabriz, in plain among corn, 2.5.26, flowers white to pink, No. 1463.

Distrib. E. Asia Minor, Syria, Iraq, Persia, Armenia.

The specimen is very young.

V. leiocarpa *O. Kuntze* var. **orientalis** *O. Kuntze* in Act. Hort. Petrop. X. 195 (1887). *Dufresnea orientalis* Bunge in Boiss. Flor. Or. iii. 109 (1875).

Hills to the south of Tabriz, 5.6.27, flowers white to pink, No. 1910; 6.28, in fruit, No. 2315; 6.29, No. 2534.

Distrib. E. Asia Minor, Armenia to Afghanistan and Baluchistan.

Grossheim, in Beih. Bot. Centrlbl. xliv. 2. 240 (1927), apparently uses the name *Dufresnea orientalis* DC. for this species, but wrongly quotes *Valerianella orientalis* (Schlecht.) Boiss. as a synonym.

V. oxyrrhyncha *Fisch. et Mey.* Ind. Sem. Hort. Petrop. iv. 51 (1839).

Near Tabriz, 6.27, flowers white to pink, No. 1911.

Distrib. Armenia, Persia.

V. Szovitsiana *Fisch. et Mey.* Ind. Sem. Hort. Petrop. iii. 48 (1837).

Near Tabriz, 5.27, flowers white to pink, No. 1909; 5.28, No. 2072a; hills south of Tabriz, 5.29, No. 2533.

Distrib. E. Asia Minor, Syria, Arabia, Armenia, Persia, Afghanistan.

Valerianella spp.

Hills south of Tabriz, 2.5.26, flowers white to pink, No. 1462; 5.28, No. 2314. Specimens too young for determination.

DIPSACACEAE.

Cephalaria pilosa *Boiss. et Huet* in Boiss. Diagn. Ser. II. ii. 122 (1856) forma **glabrescens** *Boiss. et Buhse* Aufz. 112 (1860).

Yam, 7.8.27, flowers milky-yellow, No. 2011.

Distrib. (of species) Armenia, N. Persia.

C. syriaca *Schrad.* Cat. Sem. Hort. Gotting. (1814). Roem et Schult. Syst. iii. 45 (1818).

Near Tabriz, 21.7.26, flowers white, mauve, or pink, No. 1733 ; Yam, plain under Mishou Dagh, 25.7.29, No. 2576.

Distrib. Medit. Region.

Pterocephalus canus *Coult.* in DC. Prodr. iv. 653 (1830).

Urmia district, Band, 25.5.28, flowers cream-yellow, No. 2266.

Distrib. Persia, Kurdistan.

Scabiosa argentea *L.* Sp. Pl. 100 (1753).

Tabriz, 29.6.26, flowers white, No. 1748 ; 8.6.27, No. 1839a ; Dik Dash, Yam, 26.8.27, No. 2098.

Distrib. S. Russia, Hungary, Medit. Region.

The above specimens belong to the *S. ucranica* L. var. *virgata* Grossh. in Trav. Jard. Bot. Tiflis II. i. 31 (1920), which was raised to a species in Grossh. et Schiskin Plantae orientales exsiccatae No. 123 (with the distribution given as " Transcaucasia, Persia ") and kept as such in Beih. Bot. Centrlbl. xliv. Heft. 2, 241 (1927). From an examination of the excellent material now at Kew I am of opinion that the variety is not worth specific rank and may be no more than a habitat form.

S. Olivieri *Coult.* Mem. Dipsac. 36, t. 2, f. 10 (1823).

Hills south of Tabriz, 6.26, flowers white or mauve, No. 1691 ; 6.26, No. 1747 ; 5-6.27, No. 1838.

Distrib. Arabia, Iraq, Armenia, Persia, Baluchistan, Afghanistan.

S. rotata *M. Bieb.* Flor. Taur.-Cauc. iii. 102 (1819).

Near Tabriz, 29.5.27, No. 1837. Flowers white, mauve. pinkish, or bluish, in May and fruits in June.

Distrib. Asia Minor, Armenia, Caucasus, N. Persia.

Compositae.

Acantholepis orientalis *Lessing* in Linnaea vi. 88. (1831).

Hills south of Tabriz, 27.6.28, No. 2419.

Distrib. Syria, Iraq, Armenia, Persia, Beludzhia.

Achillea cuneatiloba *Boiss. et Buhse* Aufz. 117, tab. X. f. 2 (1860) Dik Dash, Yam, 2.8.28, No. 2427. Flowers yellow.

Distrib. Azerbaidjan, Armenia.

The specimen agrees with the original description very well except as regards the indumentum. In this it agrees with the original figure.

A. filipendulina *Lam.* Dict. i. 27 (1783).

Yam, 7.8.27, flowers bright golden yellow, No. 2008 ; Yam, under Mishou Dagh, 5.8.29, No. 2589.

Distrib. Kurdistan, Caucasus, Armenia, N. Persia.

A. micrantha *M. Bieb.* Flor. Taur.-Cauc. ii. 336 (1808).

Urmia district, 5.26, flowers showy yellow, No. 1568 ; near Tabriz, 5.26, No. 1618 ; 6.26, No. 1725 ; Yam, 8.27, No. 2006.

Distrib. Asia Minor east to Afghanistan, Cent. Asia.

A. Millefolium *L.* Sp. Pl. 899 (1753).

Near Tabriz, 5.26, flowers white or pink, No. 1619 ; 6.26, No. 1726 ; weed in garden, 6.28, No. 2313. Flowers from end of May to July.

Distrib. N. Temp. Region.

A. sahandica *Turrill* sp. nov. ; ab *A. cuneatiloba* Boiss. et Buhse foliorum superiorum lacinulis latioribus, capitulis subsphaeroideis vel latissime ovoideis differt.

Herba perennis, 3 dm. alta, caulibus suberectis foliosis inferne angulatis superne longitudinaliter striato-sulcatis breviter denseque pubescentibus. *Folia* ambitu oblonga, pagina utraque plus minusve dense pubescentia vel tomentoso-pubescentia juniora densissime albo-tomentosa, usque ad 11·5 cm. longa, 1·5–2·5 cm. lata, rhachi 1.25 cm. lata integra, lacinulis linearibus vel obovato-linearibus apice obtusis vel rotundatis circiter 2 mm. longis et 1 mm. latis. *Corymbus* terminalis, compositus, sublaxus. *Capitula* subsphaeroidea vel latissime ovoidea, 5 mm. longa, 5 mm. diametro, pedunculo circiter 3 mm. longo suffulta, involucri phyllis hirsutis internis oblongis vel anguste oblongo-lanceolatis 3–5 mm. longis, externis brevioribus. *Flosculi* flavi ; ligulati pauci, inconspicui, 3·75 mm. longi, subtrilobi ; tubulosi 3·75 mm. longi.

Above Zindjanab, Sahand Range, 26-27.6.29, *Gilliat-Smith* 2504.

The species here described has a very distinct appearance from the segmentation of the leaves. Its comparison with *A. cuneatiloba* Boiss. et Buhse is made with some reservation. This latter species was described in Buhse's *Aufzaehlung* 117 (1860) where it is figured in tab. xii. The ligulate florets are described as " citrinis " in the original description. Boissier [Fl. Or. ii. 257 (1872)] describes the ligulate florets as " ochroleuci " and therefore places the species in the subsection *Millefoliatae*. The florets of our species were certainly a very distinct (even bright) yellow and on the basis of Boissier's key should be placed in the subsection *Filipendulinae*.

A. Santolina *L.* Sp. Pl. 896 (1753).

West of Lake Urmia, 5.26, flowers bright or dark yellow, Nos. 1597, 1598 ; near Tabriz, 5.28, No. 2428.

Distrib. N. Afr. and E. Medit. Region.

Very young specimens, No. 1369, from near Tabriz, 11.4.26, also probably belong to this species.

A. setacea *W. et K.* Pl. rar. Hung. i. 82, t. 80 (1802).

Yam, 8.27, flowers white, No. 2007 ; 24.6.28, No. 2317.

Distrib. Cent. Eur. and Medit. Region.

A. tenuifolia *Lam.* Dict. i. 26 (1783). *A. albicaulis* C. A. Mey. Verz. 76 (1831) ; Boiss. Flor. Or. iii. 270 (1875).

Near Tabriz, 6.26, flowers rather pale yellow, No. 1731 ; 11.6.27, No. 1938.

Distrib. Armenia, N. Persia.

A. vermicularis *Trin.* in Mem. Acad. Petersb. vi. 494, t. 13 (1818) ; Boiss. Flor. Or. iii. 266 (1875).

Valley of Livan, 9.25, flowers bright yellow, No. 1294 ; Band, 25.5.28, No. 2312.

Distrib. Armenia, N. Persia.

The material under No. 1294 is intermediate between the type and the var. *muschensis* sensu Boiss. Flor. Or. iii 266 (1875).

Acroptilon Picris *DC.* Prodr. vi. 662 (1837).

Weed in gardens, Tabriz, 6.26, flowers pink or white, No. 1640 ; 7.26, Nos. 1699, 1718 ; 9.6.27, No. 1951. Flowers in June and July but is short flowered.

Distrib. Orient, Cent. Asia.

Anthemis candidissima *Willd.* ex Spreng. Syst. iii. 593 (1826).

Tabriz, roadsides and cornfields, 5.27, white ray, yellow disc, No. 1940 ; near Tabriz, 5.29, No. 2564.

Distrib. Armenia, Caucasus, N. Persia.

A. tinctoria *L.* Sp. Pl. 896 (1753).

Yam, 8.27, ray and disc yellow, No. 2049.

Distrib. E.N. Temp. Region.

Artemisia austriaca *Jacq.* Flor. Austr. i. 61 (1773).

Yam, 8.28, flowers pale yellow when fully out, No. 2454.

Distrib. E.N. Temp. Region.

A. monogyna *W. et K.* Pl. rar. Hung. i. 77, t. 75 (1802).
A. fragrans Willd. Sp. Pl. iii. 1835 (1804) var ?

East of Tabriz, 29.10.27, No. 2182.

Distrib. E.N. Temp. Region.

A. Tournefortiana *Reichb.* Ic. Exot. i. 6, t. 5 (1827).

Garden and wayside weed, near Tabriz, 21.9.25, flowers greenish, No. 1305 ; Tabriz, garden weed, 9.27, No. 2154 ; cultivated at Kew from Tabriz seeds, 13.10.28.

Distrib. Armenia, Kurdistan, Persia, ? Afghanistan.

Carduus onopordioides *Fisch.* ex M. Bieb. Flor. Taur.-Cauc. iii. 552 (1819).

Hills south of Tabriz, 5.6.27, Nos. 1945, 1946 (with red and white florets respectively) ; near Tabriz, 6.29, No. 2567.

Distrib. Caucasus, N. Persia.

C. pycnocephalus *L.* Sp. Pl. ed. 2. 1151 (1763) var. **albidus** *Boiss.* Flor. Or. iii. 521 (1875).

Near Tabriz, a weed in garden, cultivated at Kew from Tabriz seed as 48/27, 29.6.28.
Distrib. Medit. Region.

Carthamus oxyacantha *M. Bieb.* Casp. App. 198, No. 67 (1800) et Flor. Taur.-Cauc. ii. 283 (1808).

In gardens and cornfields and on hills south of Tabriz, 7.26, flowers bright yellow, No. 1720 ; 7.27, No. 1944. Cultivated at Kew from Tabriz seed, 14.8.28.
Distrib. Caucasus, Iraq, Persia, Afghanistan, Turkestan, Cent. Asia, N. India.

XLIV.—MISCELLANEOUS NOTES.

The Director has been elected a Corresponding Member of the " Sociedad Argentina de Ciencias Naturales."

Presentation of a Fern Herbarium.—The valuable herbarium of Siamese and Malayan ferns belonging to the late Dr. Eryl Smith has recently been presented to Kew by her husband, Dr. A. Malcolm Smith (*K.B.* 1930, p. 175). The greater part of the herbarium consists of Siamese specimens which were largely collected by Dr. Eryl Smith herself or by her native collectors, though a certain number of duplicates from Dr. Kerr's collection are also included. The remainder of the herbarium may be divided into two parts, namely, collections from Indo-China, British Malaya and the Dutch East Indies and a miscellaneous series collected by Miss Mary D. Glynne (Dr. Eryl Smith's sister), in Queensland, Tasmania, New Zealand and East Africa.

The collection is unique as far as Siamese ferns are concerned and is a most valuable addition to the fern collection at Kew. Few areas have been worked so well for Pteridophyta and few are represented by so many specimens in the Kew Herbarium. All the material is well collected and preserved, and the information on the labels is, in most cases, singularly complete.

The Flora of South Australia.*—Not many years after the " Flora Australiensis " was completed it was evident that in order to provide for our rapidly increasing knowledge of the flora of Australia a new handbook or handbooks would be necessary. These could conveniently take the form of regional " floras " dealing with the plants of a single State, the production of a new edition of Flora Australiensis being scarcely feasible. Handbooks of this kind, for both Queensland and New South Wales, were published many years ago, but they were not based on original work to anything like the same extent as is Mr. Black's South Australian Flora. Indeed, at

*Flora of South Australia. By J. M. Black (Orchidaceae by R. S. Rogers, M.D.). Issued by the British Science Guild (South Australian Branch) and printed at Adelaide by the Government Printer, North Terrace, 1922-1929; pp. 746, figs. 337. Price 20*s.*, in parts as published.

the time Bentham wrote his great work, the plant life of South Australia was little known.

Mr. Black has now devoted many years study to the plants of the State and the publication of the present book is but the consummation of his life's endeavour. The earlier parts of the work have been reviewed previously (*K.B.* 1922, p. 254; 1924, p. 303). Parts 3 and 4, which complete the work, include the families in Engler & Gilg's Syllabus from Meliaceae to Compositae together with additions and emendations to the preceding parts. Of the book as a whole, those who have used it can speak with whole-hearted appreciation. The keys to the genera and species are clear, the descriptions adequate and the illustrations and general format excellent. With regard to the taxonomy there will naturally be differences of opinion here and there, but on the whole Mr. Black, working without any possibility of examining many of the type specimens, may be warmly congratulated. One would like to have seen collectors' numbers cited, bearing in mind the many species not included in the "Flora Australiensis," but it is impossible to include everything. Even as it is the book contains over 700 pages with descriptions of nearly 2500 species. Mr. Black's Flora will remain the standard work on South Australian plants for many years to come, and may also be used with advantage when studying the plants of adjacent parts of neighbouring States.

Principles of Tropical Agriculture.*—This work, the senior author of which is an acknowledged authority on present day agriculture in the Tropics, strikes a new note among text-books on tropical agriculture in that it is the general principles involved and methods adopted in agricultural operations in the Tropics around which discussion centres, without reference to particular crops. In the first part of the book, the various factors involved in crop production, according to the widely varying conditions to be found in the Tropics, are dealt with. A special feature is the careful treatment devoted to the all-important question of soils. The sections dealing with soil-related topics such as drainage, irrigation, manures and soil improvement generally are particularly informative and up-to-date. In the second part of the book, dealing with agricultural practice, one of the most interesting chapters is that devoted to the economics of crop production in the Tropics. Views as to the role of agricultural departments in the Tropics are expressed and what the authors consider should be the various functions of the ideal agricultural department are dealt with in detail.

The appearance of a book of this nature on tropical agriculture at the present time is particularly appropriate, owing to the interest which is now taken in developing the Tropics.

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*Principles of Tropical Agriculture. H. A. Tempany and G. E. Mann. Published under the auspices of The Incorporated Society of Planters, Malaya, Kuala Lumpur, F.M.S. pp. xxiii 328, ill. 25. Price not stated.

Rock Garden and Alpine Plants.*—This work comes from the pen of Mr. Henry Correvon, the renowned pioneer of rock gardens and alpine plants and perhaps the greatest living authority on them. The book of about 560 pages comprises twelve chapters, and includes eight colour plates, some half-tone photographs and diagrams, a foreword by Mr. Leonard Barron the editor, an interesting preface by the Author, and a fair index.

There is a vast amount of information collected together in this small book, and the chapters on Hardy Cacti, Terrestrial Orchids, and the culture of Alpines in pans of Sphagnum are especially interesting and instructive: these, together with the story in the first chapter of the author's travels in England and America, and his struggles in the early days to popularise his beloved plants and to interest others in their culture, give one new enthusiasm with every reading. There are chapters on the Acclimatisation and Cultivation of Mountain Plants, Plants in the Mountains, Limestone-soil and Granitic-soil Plants, the Wall Garden, the Fernery, the Conservation of the Alpine Flora, and the Rockery, with excellent illustrations on the construction of the latter. The alphabetical list of plants, though only 384 pages in extent, contains a very large number of names and descriptions of plants suitable for the rock garden, wall garden, etc. This is attained by the author's clever use of abbreviations; although this list would not aid one in identifying a plant with certainty, it provides data which would be of much value were one faced with a plant of which little else than the country of origin was known. In some instances the author still retains the old generic names, for instance *Orobus*, which is now generally separated into *Lathyrus* and *Vicia*; *Phyllodoce empetriformis*, *P. Breweri* and *P. caerulea* appear under *Menziesia*. *Weldenia candida* is described as having rose-coloured flowers: the plant at Kew has flowers of a pure waxy white; whilst one does not doubt that there are rose-coloured forms they are indeed treasures still to be sought. The colour plates are somewhat crude and not very life-like, but the half-tone photographs are very good, though chiefly of rock and wall gardens in America.

Although making the above criticism, one finished reading with a feeling of time well spent, for the volume is unique in being written by a collector, as well as a cultivator of plants who has struggled with them for over half a century. The wonderful nursery at Floraire is evidence of the success which has attended the author's efforts.

A. E.

*Rock Garden and Alpine Plants, by Henry Correvon. Macmillan & Co., Ltd., London, 1930, pp. xiv + 544, coloured plates and photographs. Price 25*s*.

(613) Wt. 144/19 950 9/30 S.E.R. Ltd. Gp. 9.